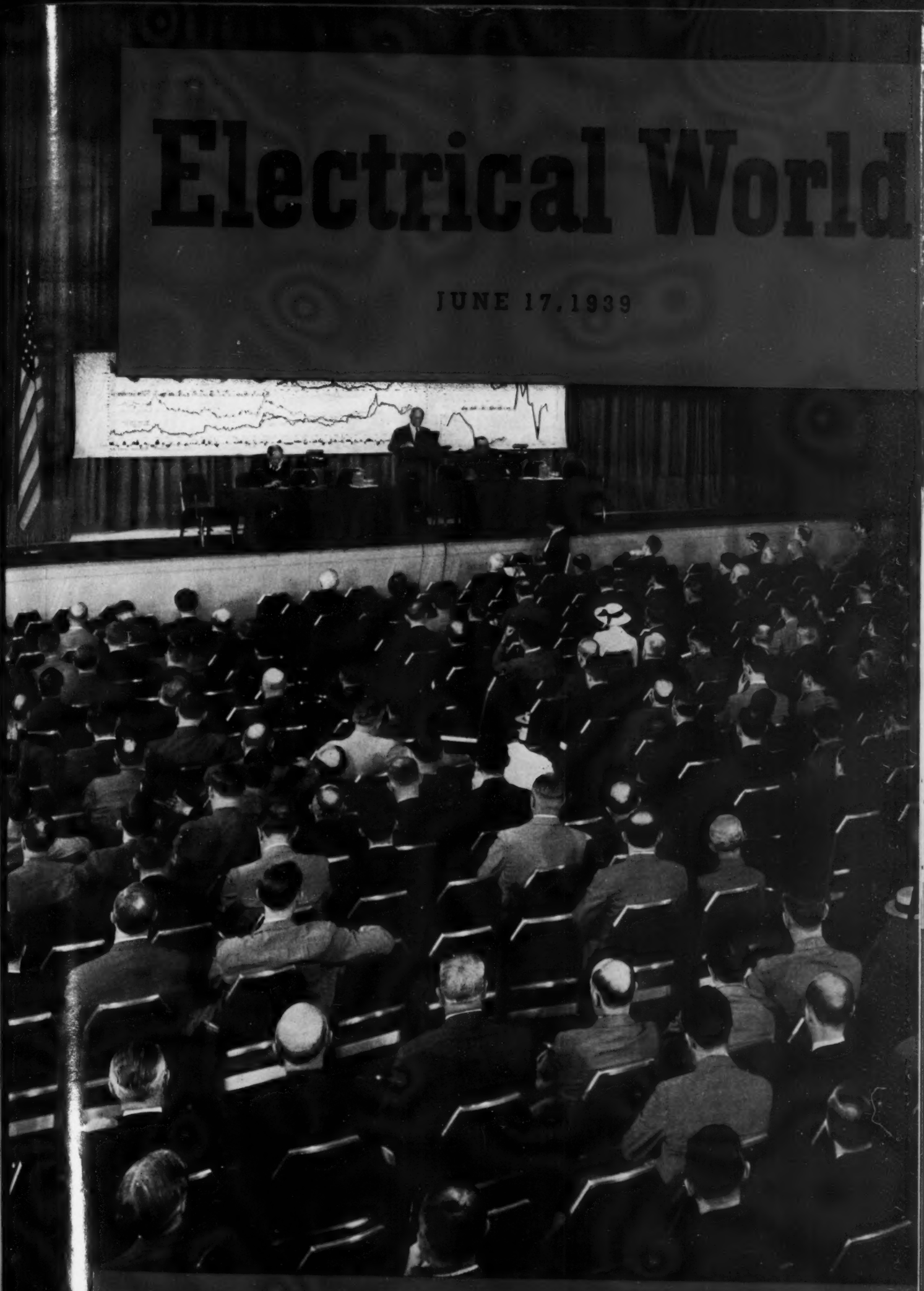
Electrical World

JUNE 17, 1939



ANNUAL E.E.I. CONVENTION REPORT NUMBER

By their Dips ye shall know them

NOW *DIPS* show the goodness of galvanizing—and the far longer life of these new, *no-extra-cost*, Hot-Dipped Murray Padlock Seals sets them out as seals apart. At last, we *have* this coating that makes steel last almost like copper.

These new *Hot-Dipped* seals are sleek and smooth. They weather well. They are the result of arduous experimentation; and nothing else known compares with them in utility and value. The seals themselves could not be improved. They *are* tamperproof and that's that. But a free sample will show what a whale of a job we've done on the protective coating. Send for it. Metropolitan Device Corporation, Brooklyn, N. Y.

Murray Padlock Seals

Back to Work

Like every other convention, several people at the end of the E.E.I. convention last week tried to evaluate it in terms of things accomplished. If they meant new programs, new policies, new campaigns, new this or that, they are going to be disappointed. There was none of that, but nevertheless it was a great convention —for two reasons.

In the first place, it was the largest in attendance during the seven years the E.E.I. has been in existence. Not so large as the old N.E.L.A. meetings, but still big. While, of course, the World's Fair was a major attraction drawing people to New York, it showed that utility people had lost some of that former timidity in gathering together as a clan.

There used to be a lot of criticism against the old N.E.L.A. Atlantic City conventions that drew five to ten thousand people. But those conventions, nevertheless, did make the people of the industry sense its importance and did give to them a feeling of pride in belonging.

It's good to get together once in a while in large numbers, if only to tell one another how good you are. It's a great thing for strengthening morale.

That matter of attendance, however, was but incidental to the main event, namely, the throwing off of the clothes of despair. While no attempt was made to minimize the problems facing the industry, there was none of the pessimism of previous conventions. Instead there was a vision of opportunity running through the remarks of every speaker. Even the Diesel bogey man was put in his place.

For a decade or more before the depression the electric utility industry was a modern Midas. Everything it touched turned to gold. People eagerly purchased its securities, each year was one of new records, expansion was rapid, consolidations numerous. Never, up to then, had there been a reverse. So when, upon top of the depression, came the New Deal attack, the industry was bewildered—mistrustful of the government, mistrustful of the public it served and sometimes mistrustful even of others in the industry.

In the ten years of depression and seven of public ownership attack the industry has seen the business grow to new heights, it has seen very little gain by its enemies, it has seen the public return to its side. In many ways the industry is like a man who, after years of rich food, was put on a diet. He lost some weight, to be sure, but he became stronger, more alert and with better prospects of living to a ripe old age.

This new realization by the industry of its basic strength does not indicate in any sense a return to pre-depression practices. The diet is still in force. It means the industry now knows that it can't be licked, that hard, intelligent planning and selling will maintain a reasonable return, that the public is fair.

The Edison Electric Institute is to be congratulated on its seventh annual convention. It marks a turning point in the history of the electric utility industry. The industry has recovered from its nervous breakdown and is now going back to work.

Business Growth, Ability to Serve Are Utilities' Strength

Facilities are amply adequate for any emergency—Attitude of government is the only obstacle in the way of rapid expansion to capacity for much greater service

C. W. KELLOGG, ***President Edison Electric Institute*** *

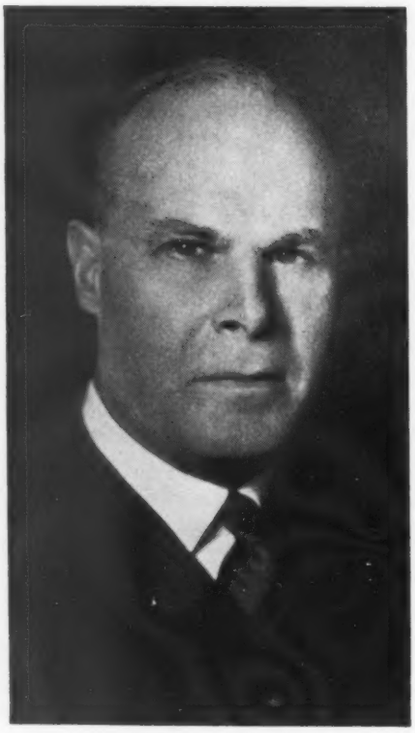
WE ARE vastly better prepared to supply power for war needs today than we were in 1917. Although the population increase has been only 25 per cent, we can produce nearly 400 per cent more power now than was then produced.

Ample generating capacity has been built by electric utilities to supply all the factories now in existence in this country except those which, in spite of the continual efforts of electrical utilities to sell them service, still manufacture their own power. Until new factories are built, therefore, the increased demand for power in time of war must be largely during the night and the early morning hours; that is, in a higher utilization of existing capacity rather than in any great demand for additional generating capacity.

No Power Shortage

In all of their fifty-seven years of history, electric utilities, except in a very few local situations, usually arising from severe drought affecting water power, have been able to supply all the electricity for which they could find a market and a large part of their efforts has always been directed toward trying to create new or larger markets. At the present time our industry is expending annually $71,000,000, or more than 3 per cent of its gross revenue, for "new-business expense" to create a larger market for its product.

The power-generating capacity in America at the end of this year will be four times what it was at the end of 1917. The total annual electrical energy supply in this country at the present time, including the production of generating plants in manufacturing establishments,



C. W. Kellogg

has reached about 140,000,000,000 kw.-hr. and the present generating capacity would supply 40,000,000,000 or 50,000,000,000 kw.-hr. additional, assuming the factories working longer hours, according to war-time schedules.

The entire industrial energy consumption of the United States in 1917, supplied by both central stations and the generating plants in manufacturing establishments, was about 23,000,000,000 kw.-hr. For those states which carried practically the entire load not only of supplying munitions to the American Army but also of filling the heavy munitions orders from the allied governments, the industrial energy consumption was about 15,000,000,000 kw.-hr. The whole amount is but a small fraction of the present annual power supply and less than a third of the additional power supply that could be furnished by existing capacity if factories were on war-time schedules with three shifts.

In 1917 there was little interconnection between different power systems, while today interconnection is widely established among electric systems throughout the great manufacturing areas of the country. Partly because of this interconnection and because of other factors, the average production per kilowatt of capacity increased from 2,828 kw.-hr. in 1917 to 3,294 kw.-hr. in 1937, a fairly good industrial year and, in wartime, procurement plans that would increase the hours of use of factories could easily raise this figure to 4,200 kw.-hr. or more.

Government Relations

The curious spectacle continues of attack by the federal government on the investment of its citizens in the electric utility business, even to the point of spending huge sums of money collected from the taxpayers to duplicate private investment. The logical procedure in bringing the output of the government plant at Bonneville on the Columbia River to the only market which could absorb it would be to feed into this existing network. This could be done for an estimated construction cost of $15,000,000. Instead, we find the government launched on a program to spend eventually $75,000,000 for additional transmission lines, $60,000,000 of which is pure duplication of existing facilities.

In the Tennessee Valley the TVA has negotiated the purchase of distributing utility companies at prices which are said to bear a reasonable

* Abstract of president's address, 1939 convention, Edison Electric Institute.

relationship to the investment in them, but the resulting loss in tax revenue to the state and its subdivisions is a still unsolved problem, brought no nearer solution by Senator Norris's statement on the floor of the Senate that if TVA paid the same taxes as are now paid by the privately owned utilities in that section "TVA would be out of business in three months." (Congressional Record, April 13, 1939, page 5866.)

At Grand Coulee on the Columbia River we find, from testimony before a Congressional committee, that the detailed estimated cost of irrigation is $175 per acre, before allowing anything for the original cost and improvement of the land, for the cost of operation of the system or for carrying charges during the development period. The grand total is at least three times as much as the cost of farm land, amply irrigated by natural rainfall, of which there is an ample supply in other parts of the country much nearer to a market for its products.

The first PWA allotment for power purposes was made in 1933. As of May 1, 1939, the PWA has on its books a total of 477 non-federal allotments involving power. Only 100 of the 477 allotments are for the establishing of new competitive municipal plants, and 46 of these competitive projects are located in the states of Alabama, Mississippi, Tennessee and Texas, in areas under the immediate influence of the TVA and the Lower Colorado River developments, where purchase negotiations are now in progress. Of the remaining 54 competitive projects, seventeen have been completed. nineteen are under construction or are still active, eight are in litigation and ten have been turned down by the municipalities concerned, although they are still carried on the WPA records. Thus, after six years, in areas outside of TVA and Lower Colorado River developments, 44 competitive projects are completed, under construction, active or in litigation. During the period from January 1, 1939, to May 1, 1939, PWA allotments for 43 new competitive municipal projects were rescinded.

Recent Municipal Elections

Since January 1, 1939, records of 25 municipal elections on proposed municipal plants and on franchises have become available. The most significant in this group is the very recent one in San Francisco, where a municipal ownership proposal was defeated, for the seventh consecutive time, by a vote ratio of two and a half to one. In the 25 elections, fourteen communities, with a population of 671,618, voted against the proposals, and eleven places, with a total population of 22,339, approved the proposals. Of the eleven places voting for municipal ownership, only seven, with a population of 11,165, involved new municipal systems. The other four had to do with the building of generating capacity or the extension of existing systems.

Rates

The industry has continued to reduce its rates and to adjust and adapt them to promote greater use of electric service by the different classes of customers. This reduction has proceeded so far that extreme care needs to be exercised in the formulation of new rate structures to insure that the charges are compensatory for all classes of service at all points throughout the rate structures.

In the eleven years ended with 1938 the average use of electricity per home was increased 110 per cent, and at the end of 1938 the average rate per kilowatt-hour in the home was but 62 per cent of what it was at the beginning. This would be a remarkable record for any industry whose basic costs remained fixed. How much more creditable does it appear, therefore, when considered in connection with a rise in hourly labor cost (in the last five years alone) of over 31 per cent and an increase in the eleven-year period in the proportion of taxes to gross receipts of nearly 77 per cent!

The real test of electric rates takes into account not only the resulting cost but the ability of the user to pay. Viewed from this angle, the figures prepared last year by one of our great industrialists, Gerard Swope, are most eloquent. He said: "In the United States a man must toil 3.6 minutes to provide for one kilowatt-hour of energy; in the nearest European country he must work 12 minutes, or more than three times as long, and in one country he must work 43 minutes, try, generally, the development and distribution of electrical energy have or twelve times as long. In this country the average is 1.2 minutes. Electricity has been in private hands, and the problem making it available to more and more millions of homes has been given constant study, so that now more than 22,000,000 homes are electrically connected. The increase in use and the resulting conveniences are apparent on every hand."

Sales

The pressure for new business continues throughout the electrical industry. Because of less favorable business conditions, sales of electrical appliances in 1938 were substantially below the levels for 1937, but such sales for the first quarter of this year have shown a marked improvement. Compared to the first quarter of 1938, sales of electric ranges were up 23 per cent, of electric refrigerators up 41 per cent, of washing machines up 42 per cent and of water heaters up 100 per cent.

Since electricity is of value to the customer only as it is consumed in useful appliances, increased sales of electricity (and therefore the reduced price per kilowatt-hour arising from increased use) are much more dependent upon the invention, general acceptance and lower cost, through mass production, of electrical appliances, than upon any other single factor. The average householder, for approximately the same monthly bill he paid thirty years ago merely to light a few carbon lamps, now

Gerard Swope (left), president of General Electric, presenting the Charles A. Coffin award to S. B. Way, president of Wisconsin Electric Power. H. P. Liversidge (right), president of Philadelphia Electric, chairman of prize awards committee

A. W. Hastings, Engineers Public Service, and Sam Ferguson, Hartford Electric Light

gets about four times as much light in his house, and in addition has an electric refrigerator that operates for less than his former ice bill (not to mention an even greater saving in avoidance of food spoilage), has a radio set, a vacuum cleaner, possibly a washing machine and several minor devices, all working for the family. Electric utilities have approximately $750,000,000 invested in rural lines and equipment, and the problem of load building on these lines, with appliances that will enable the farmer to help himself through the effective use of electrical energy, continues to demand the serious attention of our commercial executives.

Although industrial sales were down 16 per cent in 1938, compared with 1937, yet over a period of years they have shown a very favorable relation to indices of industrial production. According to the 1929 Census of Manufactures, 76 per cent of all electric motors in industrial plants were served by purchased power. The 1929 Census was the latest one to include data on power utilization in industrial plants, but the developments since that time may be estimated by comparing the changes in the Federal Reserve Board index of industrial production with our own figures for the sale of power to industrial customers. In 1929, when this index showed an industrial production figure of 120, our statistics showed industrial power sales of 43,000,000,000 kw.-hr. In 1938, when the industrial production figure was only 86, our power sales amounted to approximately 45,000,000,000 kw.-hr. In the face of a decrease in industrial production of 34 points, our industry has increased its power sales nearly 5 per cent, which would seem to indicate that the process of electrifying American industry has been progressing steadily in spite of the depression.

Trade Relations

Trade relations have received the most considerate attention of electric utilities, and this must continue to be the case. In our drive for increased sales of electricity many misunderstandings arise on the part of merchandisers, dealers and others concerned with electrical merchandising because of lack of knowledge of the facts. We should bear in mind that it is difficult for the merchandiser of electrical appliances to understand the load-building problems involved from the viewpoint of the utility man. When there is knowledge of the common advantage to be gained, the sales task can more easily be accomplished. Available statistics show that during the past four years electric utilities sold 15 per cent of the total volume of electrical appliance merchandise and dealers sold 85 per cent of the total.

The need for more adequate wiring continues to be one of the serious obstacles to the greater use of electric service. New wiring products and methods, which constitute a big improvement over previous materials and methods, have been developed and have been widely tested, but the application of these necessarily depends upon their careful appraisal and approval by code-making bodies, insurance interests and city and state authorities. The Edison Electric Institute has made a number of specific proposals looking toward the approval in the Electrical Code of these improved materials and methods and their widespread application. A large volume of data has been assembled to prove their safety and practicability, and publications have been and are being prepared showing their application in actual commercial establishments, factories, residences and other types of buildings. These proposals were submitted last year to the electrical committee, which formulates and revises the National Electrical Code, and are receiving the careful consideration of its several subcommittees. At the meeting of the main committee in December of this year their adoption into the Code will be voted upon.

The present state of inadequate wiring, it is obvious, can only be corrected through the concerted sales effort of all interested in this industry. The object is to get much more copper and many more outlets in all types of buildings. Considerable has been accomplished already through the stimulus of the Adequate Wiring Program of the National Electrical Manufacturers Association. It is important that electric utilities generally should give this project their strong support. As fast as new materials and methods can be taken advantage of they should redouble their efforts to sell much more electric wiring and thus break down this old barrier to the greater use of electric service. The proposed code changes represent practical means for the benefit of the customer and of all branches of the industry. They should be put to use to increase radically the conducting capacity of electric wiring in existing buildings and, of course, in new ones also. They should help materially to solve the wiring problem for years to come.

Technical Advances

Among the advances in recent years are the more general availability of 3,600-r.p.m. generators in large sizes and the use of hydrogen for cooling. Neither of these developments is strictly new, but their wide availability now makes them accepted factors in the design and operation of systems. Recent advances in the study of insulating materials and the study of stresses—electrical and thermal—have already improved the design of equipment and further developments may be expected. It is not unreasonable to suppose that new insulating materials will appear which will still further improve the design and capacity of equipment and of electric systems. Developments in recent years in lightning protection, in interrupting capacity and mechanical reliability of switchgear, in relaying methods and in automatic supervisory apparatus have made important contributions to system capacity and reliability.

An important feature of the past five years has been the steady replacement of old equipment and the salvage through modernization of many of our older power stations. Even allowing for differences of reporting and classifying, fixed electric capital, as reported by the Bureau of the Census, showed no increase during the five-year period 1932 to 1937, notwithstanding the expenditure for construction by private utility companies during that period of some $1,150,000,000. That this is bearing fruit is shown by the fact that, although the output of electricity by fuels increased between 1930 and 1938 by some 9,000,000,000 kw.-hr., or nearly 15 per cent, the amount of fuel used in the two years was identical. Most of the funds which have been required for our construction budgets have been made available through the annual charges for depreciation and from other current sources, including some diversion from the stockholders' divisible profits. Even in 1938, while total financing by our operating companies amounted to some $954,000,000, less than one-sixth of this represented new money from the sale of securities.

The Operating Record

The last calendar year has shown again the relative stability of the electric utility industry. While the index of industrial sales countrywide in 1938 was 17 per cent below the previous year, the electric utilities showed for the same period a decrease in gross revenues of only 6/10 of 1 per cent.

During the year 1938 the electric light and power industry made available for distribution 115,000,000,000 kw.-hr. of electrical energy, a decrease of only 4 per cent from the previous year, when this supply was the highest in industry. The decline in business activity beginning in 1937, which was the most rapid in all of America's economic history, was reflected in the decrease in sales of industrial power which dropped by 16 per cent from 53,500,000,000 kw.-hr. to 45,000,000,000 kw.-hr. Increases in sales to other classes of customers, however, substantially offset this decline in industrial power. Small commercial service increased 4 per cent and domestic service gained more than 9 per cent. Generation for the first five months of 1939 was 10 per cent above the corresponding period in 1938 and 1 per cent above the first five months of 1937.

Financial

Gross revenues in 1938 decreased 6/10 of 1 per cent from the high mark of 1937. The decrease was $13,000,000, from $2,181,000,000 to $2,168,000,000. Operating expenses, due partly to the good streamflow which enabled the further utilization of hydro-electric plants, showed a small decline, but the steady upward climb of taxes and of charges for depreciation nullified any such savings, and operating income for the year showed a loss of 3 per cent from the year before. Further declines took place in non-operating income, reflecting the continued decrease in the productivity of investment throughout all lines of business in the United States. The preliminary figures for net income reveal a decrease for the year 1938 of about $30,000,000, or 6 per cent from 1937 net income.

These net earnings have paralleled the course of business activity to a remarkable degree, the net earnings for the first quarter of 1938 being 8 per cent under that of the previous year and the second quarter 15 per cent under. Improvement in industrial activity brought the third quarter to 4 per cent below 1937, while the last quarter was measurably ahead. It is gratifying to note that for this year, 1939, to date net earnings have recovered almost to 1937 levels. The percentage of net income, however, is still far below its levels of ten years ago.

Optimism and a Warning

The results of the past year have confirmed the long-established reputation of our industry for relative stability compared to other lines of business, and it is therefore encouraging to find ourselves no worse off than we are after six years of attack by the government of the most powerful nation on earth, backed by a correspondingly rich treasury and correspondingly pervasive propaganda. We must never forget, however, that, more important than all of these for our future welfare, is what our 27,000,000 customers think about us and about the sort of job we have done in the public service.

During all these years that public has had to face so many and pressing problems of its own that we cannot ask or expect from them special sympathy with us in our specific troubles. They will size us up solely on the efficiency and dependability of our service and on the way we conduct ourselves in our daily relations with them and as citizens in their community. In my opinion it is the degree to which we have satisfied these our service obligations that has brought us to the present day still a strong, stable industry. It remains only to remind you, therefore, that our salvation is largely in our own hands. With our past achievements and with the resolve to do even better in future, I believe that we can and will work out that salvation.

A. E. Julian (right), McGraw Electric, presenting the water heater award to W. Marshall Dale (center), and Roy Bridges, Indiana Service Corp.

J. D. Wood and W. R. Swoish, Roller-Smith Co. and W. Bakker, Public Service Electric & Gas

The Outlook for the Electric Utilities

Future of the electric utilities depends upon finding solutions of problems that confront our American economy — Government policies as to deficit financing and money standard and its attitude toward private enterprise are the determinants

FLOYD L. CARLISLE, *Chairman Consolidated Edison Company of New York, Inc.**

IT IS DANGEROUS for any one to be dogmatic in discussing the outlook for the electric utilities. Our industry has been one of the few leading industries in the country that has increased its output during the depression and has shown ability to adjust itself to changing conditions. The electric industry is so interwoven with the life of the total population and the whole manufacturing and industrial economy that it cannot permanently prosper except as the whole country prospers.

I cannot but contrast the general situation in America with that of the other leading industrial nations of the world. Unlike England, Germany, Italy and Japan, this country raises practically all of the food necessary to support it and it requires the labor of only 20 per cent of our population to do so. Here also there is abundant land and resources upon which to support a much larger population, and the crowding and pressure that exist in many European countries are entirely absent here. We, further, possess more than half of the world's gold, which is available for purchase of raw materials and commodities which may be necessary for our prosperity. Most of the rest of the countries of the world are unable to use gold as a means of purchasing raw materials, and are now practically on a barter basis. All of the major European countries are, furthermore, employing a considerable percentage of their people in manufacturing implements of war. Our geographic location, fortunately, guards us from this great menace. The people of America are certainly in a far more favorable situation to live at peace and to enjoy abundance than those of any other country. Our internal situation is of course tremendously affected by the long-continued unemployment of large numbers of our people, and it is with the solution of this problem that we are most concerned. In 1936 and 1937 the production of goods and services greatly increased from the low point of 1932 and 1933, and gave promise of holding. The decline in late 1937 and in 1938 has been difficult for us to understand, and to analyze its causes is by no means a simple task.

Industry Must Provide Employment

In discussing our domestic situation, the question pressing for solution is, how private industry can employ all of the people able and willing to work. Blind, unreasoning criticism of governmental policies will not cure the situation. Intolerance of any point of view is not conducive to a solution of difficulties. Our American private economy today is giving work to at least 43,000,000 of our people, but is unable for the moment to employ about 10,000,000. Some of those 10,000,000 are perhaps unemployables. They must in some way be supported out of the national economy.

Our national turnover in the year 1939 is assumed to be approximately $65,000,000,000. An increase of this amount to $80,000,000,000, it is said, will end unemployment. Our whole governmental structure and the maintenance of the 43,000,000 people gainfully employed comes solely from the working of our private ownership of commerce. The salaries of government employees, the army and navy, the courts, PWA, WPA and other government activities are only possible as taxes to be levied now or in the future, to be taken out of the turnover of business. Wages, interest, dividends, come solely from these sources. There is, furthermore, ever present the tremendous desire on the part of every one to purchase more goods and services. The American consumer has been sold the value of American commodities. Increased production of commodities creates buying power. Buying power cannot be created merely by creating more currency or bank deposits. If that were true, the volume of production could be raised to any limit by simply printing money. The automotive industry is a classic example of the production process creating its own buying power.

When private industry expands, it is through reserves or earnings or new capital issues. Such expansion automatically creates wealth and buying power. There are many intangible things that have to do with this. There has to be a hopeful outlook by the people toward the future. The manufacturer who buys new machinery and markets a new product has got to have some confidence that his product will sell and that he will realize a profit.

Hindered by Fear

The fear of a European war and our possible involvement in it has undoubtedly played a considerable part in holding back increased production. There is a further widespread fear that we never can stop our present government deficit financing. In my judgment, after nine years of unbalanced federal budget, the surest thing to return prosperity is to determine at some time, in the not too distant future, to end this condition. It is, of course, quite possible to do this. It is to be hoped that private business can reabsorb the unemployed as the government lessens its expenditures for this

* Abstract of address to 1939 convention of the Edison Electric Institute

purpose. A definite, certain program would, in my judgment, greatly restore confidence and lead to business expansion. Even if there is no exact certainty as to the ability of business to absorb the unemployed, the failure to end deficit financing would be even more tragic. All our high-grade securities, including government bonds, and the value of our currency, would be destroyed if we were permanently on a basis of issuing debt in excess of income.

Industry Can Re-employ

I do not for a moment believe that private industry cannot absorb our unemployed. I base my judgment partly on the picture as I see it in the city of New York. Since 1930, with the exception of a few ventures like Rockefeller Center, like the slum clearances and low-cost housing, and with the further exception of government expenditures for roads, parks, school houses, tunnels, bridges, etc., there has been no building by private capital. New York is the largest manufacturing city in the world, but for nine years there has been very little new machinery bought here. Many buildings have been torn down to ease the tax burden. I recently made a trip around the waterfront of New York, where many of our manufacturing establishments exist, and I am certain that with an upturn of production great modernization will occur. Every man in business is anxious to make money. The profit urge is ever here. New York City has always grown by fits and starts. It will take ever so little for New York to resume its own upward spiral of expansion.

In our own business the investor is more fearful of government competition than anything else. There are some people who believe that the public utilities are certain to be taken over by government. I do not share this view. It would require at least $15,000,000,000 of new government financing, federal, state and municipal, to take over the electric power business either by purchase or by duplication. Certainly no government that believes in the preservation of American private economy would attempt this program because it would mean such an enormous increase in government debt that it would affect the market value of all existing government bonds, render much more difficult future government financing, to say nothing of throwing a further enormous burden of taxation on all other business.

Balance the Budget

To preserve our American private capital economy, it will be absolutely necessary, some time within at least two or three years, to end further government bond issues and to find ways and means of slowly reducing the principal of those outstanding. I wish there was an exhibit at the World's Fair something like this: Underneath would be the farm, factories, houses, stores, banks, insurance companies, railroads, public utilities, etc., supporting and maintaining government. This exhibit would dramatize the fact that only out of prosperous production and distribution can government activities be maintained. If this cannot be done in the United States, then our whole economy must change, and there are various exhibits at the World's Fair that you can look at showing the other economies.

For more than thirty years the electric utilities of this country have in most instances been regulated by the states. We have been able to grow and prosper under such regulation, and there has been a tremendous expansion in the use of our services under it. The electric utilities can use every year large amounts of additional capital. They have demonstrated their ability to expend during the depression years. In the city of New York, since 1930, we have increased our output of kilowatt-hours 50 per cent.

Gas and steam and telephone utilities can likewise provide additional investments that will in turn relieve unemployment. The vacuum in new and more modern machinery as a result of the depression constitutes an enormous field for private expansion. All of us, I assume, want growth in our business. Our present load curves reflect increasing production. When one sees the research laboratories of the electrical manufacturing companies and of other progressive industries, the new lighting effects, the almost complete air conditioning of the buildings at the fair, one's only concern will really be as to how to meet the growth that the exhibit portends.

Our industry was started a little more than 50 years ago with an idea and has become one of the largest industries in America. It was built up by men of great inventive genius, courage, flexibility, capacity to meet and to adopt progressive ideas. There have been far more difficult times in the past for this industry than exist today. We have found in New York that it is possible to increase the sale of appliances on a scale greater than before the depression. We are essentially merchants of service. If all industries of the United States had the ability to expand their services like our industry has done, there would be no depression and no unemployment. In fact, our industry has actually increased its output in a greater proportion than almost any other. Greater volume at lower prices is the formula which has built up American business.

Future Is Bright

The confidence in the future of the American private ownership economy is overwhelmingly expressed in the fair; $155,000,000 has been expended to put on a magnificent international exhibition at a time of great depression to show the American economy to the whole world. The new products of laboratories mean more efficient machinery, better houses, better clothes, cleaner and more nourishing food products, more modern transportation in the air, on the railroads and on highways, television, air conditioning, more modern equipment for the farm. There are enough new things shown at the fair to keep America busy manufacturing and selling them to the American people for a long time to come.

Floyd L. Carlisle

War Procurement and Electric Power

A defensive war, the only kind of war in which this country is envisaged as a participant, will find a comprehensive organization for an adequate power supply already provided — No danger of power shortage is apparent

GEN. CHARLES KELLER, *Member Board of Directors, Public Utility Engineering & Service Corp.**

[Preliminary Note: The following, which deals with power dispositions in the event of war, is the latter part of General Keller's paper. The first half described the functioning of the War Industries Board in its handling of power supply problems during the World War and how, out of that experience, arrangements have been made to organize peace-time military procurement activities into a planned War Resources Administration when and if that becomes necessary. The two slides referred to were shown during the talk, one a diagram of the peace-time procurement set-up and the other the organization of the War Resources Administration.]

AS MANY of you already know and as has been shown in the two slides, the War Department now recognizes the vital importance of an adequate supply of power for every industry to which an order for war materials is to be allocated. The peace organization of the procurement branch of the office of the Chief of Engineers has a Power Survey Unit. Its duty is to collect information concerning installed capacities, prospective increases therein and existing loads. This unit was established shortly after the war and it has, since then, from time to time asked for and received our help in formulating and revising its annual questionnaires, the latest revision having been made only a short time ago. These questionnaires are distributed by officers attached to certain of the river and harbor improvement offices maintained by the War Department. The resulting information is compiled and digested by the Power Survey Unit and thereby put into convenient form for any use which the Assistant Secretary of War may direct, including its consideration in the tentative allocation of manufacturing facilities for procurement of war materals. There is, of course, no need to control the peace-time operations of the power industry and no such control is attempted.

* Abstract from paper to 1939 convention of the Edison Electric Institute

Gen. Charles Keller

Power in War Time

In the transformation of the peace supply organization to a war footing and its transfer to the proposed War Resources Administration controls are provided for all industries directly involved in the war supply program and for many others whose connection with it are, at most, somewhat indirect. Naturally, therefore, the scheme for that administration calls for a unit to deal with power, the Power and Fuel Division, to which your attention has already been called. It is my understanding that this division will exercise control over power through special agencies organized in the first instance in the principal industrial centers by district engineers of the War Department. The personnel of these agencies will consist of civilians selected for their expert knowledge. Once organized, these agencies will be responsible to the Power and Fuel Division.

No Program Published

No detailed program for the control of power has been published, but its logical scope is clear enough. The agency established for that purpose must draw its principal personnel from the industry itself, and to the extent that it requires unusual authority for war purposes, this authority should be temporary, merely for the duration of the war. Experience in 1917 and 1918 teaches that the whole-hearted co-operation of the industry can be counted on, but this co-operation will be of greater service to the extent that the operators of power systems are assured of intelligent understanding and friendly and impartial consideration of such suggestions as they may advance.

Control should be local and Washington should enter to the least extent necessary to protect and supplement the supply of power. To this end, the district offices must be required to maintain and keep currently correct the information now collected in the power survey, thereby making known what has been called the power "capability" of each district; that is, its ability to supply further demands, the measures proposed by the industry for supplementing the existing supplies and the assistance, financial and otherwise, that will be required to relieve existing or threatened overloads and to execute the plans for expansion. Close co-operation between the procurement agencies and the local power control unit will of course be established by the War Resources

Administration so that war orders will be allocated with due regard to the availability of energy when production is to be begun, and this cooperation will serve to reduce to a minimum the problems of the power control unit. For the rest, actual or impending shortages must be dealt with, as in 1917, by intelligent use of priorities and by timely arrangements for installing additional capacity in the way of generating, transmission or distribution facilities as may be indicated by the power survey.

The delay and difficulty experienced by the Power Section in securing government money for new construction served to retard its program and to embarrass it greatly. It is gratifying to know that this phase of the problem of mobilizing power for war purposes will receive proper attention.

No Repetition of 1917-'18

It is clear that no such condition could come about with respect to power as was experienced in 1917 and 1918 and that we can now rely on orderly management of procurement for war purposes, including the procurement of power.

In the preceding, nothing has been said as to the amount of the power shortages experienced in 1917 and 1918 and of the light, if any, that they afford as to the probable increases in the demand for power in any future war.

As to the shortage of 1917 and 1918, as far as I know, there is no information available other than the somewhat fragmentary information contained in the published report of the Power Section entitled "The Power Situation During the War," and this is not stated in the same way for all the localities in which the Power Section had offices. Using those figures of the report that appear reasonably definite and positive, shortages existed late in 1918, as follows:

	Kw.
Niagara Falls and Buffalo	112,000
Pittsburgh territory	76,000
Northeastern New Jersey	35,000
Philadelphia and vicinity	60,000
Baltimore	42,000
Total	325,000

These figures are approximate and they do not include any allowance for New England or for the Pacific Coast. They may warrant fixing the total shortage that would have been experienced in 1919, had the war continued into that year, at not over 500,000 kw.

Remembering that we were then manufacturing war materials for England, France and Russia, as well as for ourselves, and that we were fighting in Europe and expected to continue to do so, I doubt whether the power shortage of 1918 gives conclusive evidence of what might be expected in a defensive war, especially in view of the timely control that would now be exercised over the placing of war orders. Yet the generous estimate that I have arrived at as to the 1918 shortage does offer a figure with which to make future comparisons.

Probably the investigations of the National Defense Power Committee, based as they should be on a defensive war, waged in our own country, will soon furnish more trustworthy figures.

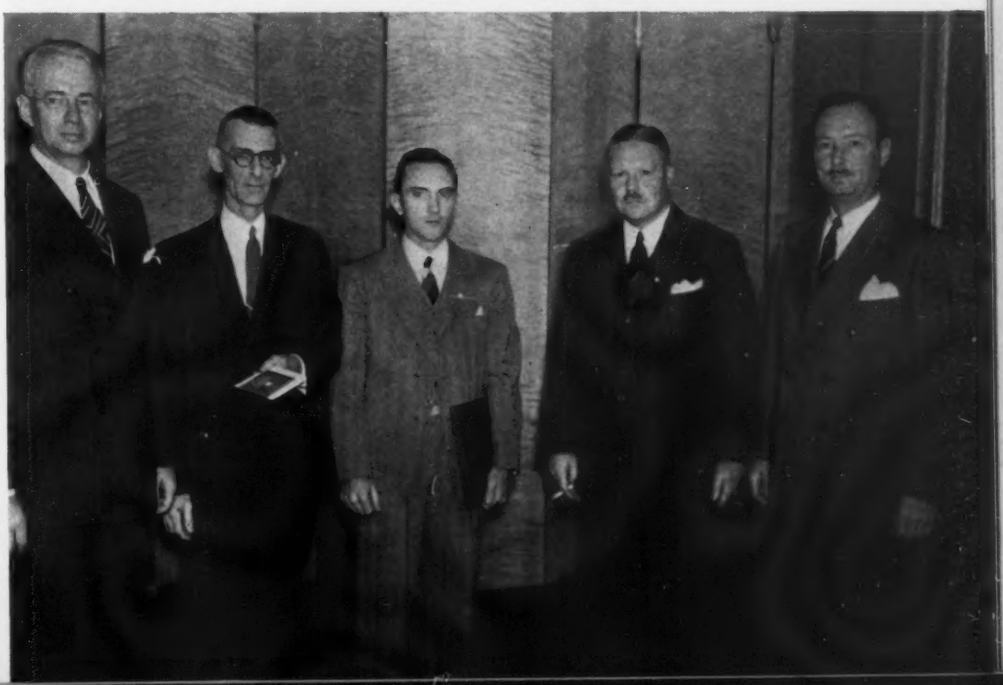
No Danger of Emergency Shortage

One final remark on the provision of war power and I shall close. It seems to me that it would be unwise to attempt to decide the localities in which war shortages of power will occur and their amount and to install the indicated additional capacity at those places before we actually are engaged in war. Shortages are not likely to occur for some time after war is declared because early war orders will be placed with industries already in existence, amply supplied with power and able to use their facilities immediately to make war supplies. When these plants have been loaded, then orders will be assigned to other manufacturers whose plants will require greater or less changes and increases. Finally, if necessary, orders will go to manufacturers who will have to build completely new plants before they can start making war supplies. Thus, on the outbreak of war, there will be enough power and, thereafter, time will be available to supply additional facilities where they will actually be needed.

Prepare in Peace

In my opinion, it will be sufficient preparedness to complete, in time of peace, detailed designs for generating units of agreed size, together with accurate bills of material and schedules of delivery for the various items in accordance with dates of completion that have been co-ordinated with the other requirements of the war program. In this way no money will be spent on needless or badly located plants, while, under existing plans for war control, ample time will be available to install additional equipment for the generation, transmission or distribution of energy, or for two or more of those purposes, when and where the need becomes apparent.

Kenneth Curtis (left), Curtis Lighting, and the three winners of the Augustus D. Curtis award for the greatest contributions to the advancement of artificial illumination of interiors or exteriors of commercial and public buildings—H. L. McKinley, Georgia Power; S. H. Johnson, Carolina Power & Light, and Merrill H. Skinner, representing Howard Sharp of Buffalo, Niagara & Eastern Power, and Darwin Curtis (right), Curtis Lighting



What the Customer Thinks of Utilities

Attitude derives from three elements — from what the customer pays for what he gets and from opinions of the utility as a neighbor and as a citizen

ELMO ROPER, ***Distribution Consultant, New York City*** *

YOUR CUSTOMER does not form a single judgment about you; he forms three separate judgments, and what he finally winds up thinking is a composite of all three judgments.

In the first place there is the judgment he passes on you when he thinks of his relations with you on a strictly buyer-seller basis. In this judgment your prices and your service are important.

But the customer also forms a set of judgments about you as a neighbor. And bear in mind that he is often confronted with having you as a neighbor whether he wants to or not. In this set of judgments the courtesy and the other neighborly qualities you show are important.

The third set of judgments which your customer forms about you have to do with you as a citizen. And you are no ordinary citizen like John Smith, but a citizen of such great importance that your activities and your welfare are as much a matter of national concern as the welfare and activities of our army and navy. Translated into local terms, you are regarded as being able to help or hurt your town, which is also your customers' town.

Your customer has definite reactions as a buyer, definite prejudices as a neighbor and equally definite ideals as a citizen. And he is judging you as a seller of a commodity he needs, as a neighbor he has to live with and as a citizen.

When I first started to do work for utilities I took the trouble of making a rather exhaustive inquiry as to what constituted the prevailing philosophy of the management of the utility industry as a whole, which fortunately for me, turned out *not* to be the philosophy of my new clients. These two things stood out as integral and important parts of that philosophy: "Don't worry about rates not being low enough because these governors and commissions are so anxious to make political capital out of rates that they are constantly on our neck to drive rates down and we have to fight constantly against *any* rate reduction in order to keep the rate situation in balance. Also, don't worry if you find that people call utility rates high. All people call all utility rates high at all times regardless of a justification or a lack of it."

Elmo Roper

On the Wrong Track

After several years' work in the field, I find myself completely opposed to both statements. In the first place, the majority of people are not apt to call utility rates high if they aren't high. We have asked the following question in communities scattered all over the United States: "Do you regard the monthly cost to you of the following services as high, low or reasonable?" and we have named the light bill, the gas bill, the water bill, the telephone bill and the tax bill. Except for some confusion over the fairness of the telephone bill, we have found that by and large people have rather unerringly put their finger on high rates, and have been perfectly willing to call rates reasonable when they actually were reasonable. True, we have found very few people willing to call any of these costs low, but they have used the word "reasonable" in describing them in every single instance where I personally consider the costs of these services as being reasonable. In the Puget Sound district, for example, where there are actually low electric rates, many more people called the electric bill low than called the telephone bill, the tax bill, the food bill or the rent bill low.

Who the Critics Are

I think it would be interesting to examine briefly at this point the question as to who it is, what kind of a person it is who is critical of big business generally, and the utility business specifically. I think that if I were to select the single greatest mistake most often made by clients of mine who represent big business, I should say that it was the assumption that their public relations policy had as its primary concern the poor people, "the people who have nothing except a vote," to borrow a phrase. They make the blithe assumption that the intelligent people—the doctors, lawyers, and other professional

* Abstracted from address to 1939 convention of Edison Electric Institute.

people, and those others with sufficient money to be in the A economic level—that all these people are on the "right side" in that they understood the problem and that they are people business can safely regard as allies in any struggle against increased government regulation, or in any battle at the polls. I say this is the most serious mistake advisedly, because I have not found that condition to be true. Time after time our cross-tabulations have revealed that the severest critics of certain big businesses are the most educated groups, the professional people. It has been said that all political revolutions start at the top and spread to the masses. It is my opinion that all effective demands for business reform start also at the top. Perhaps some of the politicians who seem to be embarked on an anti-business plank as a means of rabble-rousing have investigated and found that a considerable percentage of their most intelligent electorate is to be found among the critics of whatever business practice is under fire at the moment.

The Questions

Some time ago we tried the experiment of asking the following questions in a number of studies we did for utility companies. It was our thought that the answers to these questions might prove more significant in their cross-tabulations than in their straight results. One question was our old one about "Do you regard the cost to you of the following services as high, low, or reasonable?" and in that list we named the electric company, the gas company, the water company and the telephone company. We also asked which of these companies gave the most courteous treatment to customers and which gave the least courteous treatment. We then asked which one of these companies stood out as being the most active in promoting the general welfare of the city and which stood out as being the least active. We also asked whether the public thought the city would be better off if it, or some other branch of government, owned any of these utilities and, if so, which one especially.

Our cross-tabulations on these questions have provided what is to us a very interesting discovery. First, let me say that the people have very definite ideas as to which utility gives it the most courteous treatment and which gives it the least courteous treatment. Second, they have very definite ideas as to which company is the most and which company the least active in promoting the civic interest, but it is in the cross-tabulations where the real news comes. Let's take one unnamed city and look at the results to each of these questions. In answer to the question on costs, 35 per cent of the people called the cost of electric service high and a similar amount, 30 per cent, called the cost of gas service high.

It is not easy to keep percentage figures in mind, but remember that a substantial number called both services high, and a few more called the electric bill high than called the gas bill high. But in answer to the question about where they get courteous treatment, 48 per cent picked the light company as giving the most courteous treatment and only 8 per cent picked it as giving the least courteous treatment. On the other hand, only 7 per cent picked the gas company as giving the most courteous treatment and 46 per cent picked it as giving the least courteous treatment. In short, the electric company was pretty generally regarded as giving courteous service, and the gas company was not.

In answer to the question as to which company stood out as being most active in promoting the general welfare of the city, 60 per cent picked the electric company, 9 per cent picked the gas company. So up to this point we have learned that the electric company is regarded as more of a civic asset than the gas company, and gives more courteous treatment than the gas company, but that a few more people call the electric company's bills high than call the gas company's bills high. In the next question we may have some clues as to what prompts a desire for municipal ownership. When we asked if the people thought the city would be better off if it owned one of the four utilities, and if so which one, 31 per cent named the gas company; only 4 per cent named the electric company.

Apparently being a good neighbor, as exemplified by courteous treatment, and being a good citizen, as exemplified by activity in promoting the welfare of the city, weighed more heavily in the minds of the people than did the question of the pure buyer-seller relationship, as exemplified in rates. Of course it must be remembered that there was no great outcry against the rates of either company in this particular instance.

Now let's look at some of the cross-tabulations. Of those few people who labeled the gas company most courteous 43 per cent also called it most active in the civic sense, but of those many people who labeled the gas company least courteous, only 3 per cent called it most active in a civic sense. Of those few people calling the gas company most courteous, only 19 per cent called the gas bills high, but of those many people who called the gas company least courteous, 47 per cent called the gas

[*Continued on page 135*]

Fred Rahter and Arthur C. Watt of Commonwealth & Southern

D. C. Green, Central Service Corp., and Wendell L. Willkie, Commonwealth & Southern

Balanced Load Building

Constantly changing conditions and factors outside the sales executive's control make the achievement of balanced load practically impossible, which is best reason in the world for striving toward it

GEORGE E. WHITWELL. ***Vice-President in Charge of Sales, Philadelphia Electric Company****

FOR ANY SYSTEM a load-building program is adequately balanced if it recognizes the many factors involved in approaching conditions of maximum service economy and of adequate net income and is directed to attain the closest possible approximation of both. Even this practical definition of balanced load building must clearly recognize that the problems to be solved in reaching the objectives are not susceptible to exact mathematical solution. These problems involve not only utility costs and maximum economy in connection therewith but also such important items as the relationship of rates of costs, the effects of business depressions, the nature and amount of industrial development, the present and future load characteristics of different classes of service and of major loads within classes, the amount and kind of outside pressure for rate reductions, the character of competing fuels, the degree of load saturations and many other factors.

At best, present and future points of maximum balance in load building can only be roughly established. Nevertheless, it is possible, and highly desirable, to approximate them.

A Specific Case

A practical analysis of the major features which determine the best balance in load building must, therefore, recognize certain characteristics, which are significant and, at times controlling, in their effects upon an adequate solution of the problem for any individual case. Fortunately, however, in studying a specific case the situation can be simplified materially by making certain assumptions.

Consequently, in trying to make my subject clearer by using, as an illustration, the specific case of a large Eastern metropolitan utility, a practical study of balanced load building can begin by making the following assumptions:

George E. Whitwell

1. The discussion applies only to the loads of industrial, commercial and domestic classes of service.

2. Rate structures of different classes of service are assumed to follow closely the cost relations applicable thereto.

3. Unless otherwise specified, the shapes of each class of service load curves during the critical period of the system load are assumed to remain unchanged for all volumes of added load of each class and, correspondingly, the annual load factors of each class are assumed to remain constant.

4. The relative volumes of load of the domestic and commercial classes of customers are assumed to change in the amounts of use of individual customers without a change in the total number of customers comprising the class. The volume of load of the industrial classes of customers is assumed to change either through a change in the amount of use of existing customers, or through the acquisition of additional customers of a size approximating the size of the average customer of the class.

5. The price structure of electric utility service is assumed to be competitive with prices of other equivalent forms of power and fuel, and the market is assumed to be not saturated.

6. Present methods of power production are assumed to continue.

7. The analysis applies to normal business conditions.

The foregoing assumptions deserve real consideration and, consequently, should not be passed over too hastily because they presuppose, in any utility making a study of balanced load building, that certain fundamental factors, without which there can be no balance in load building, have already been receiving careful study. Thus, if this discussion is to be limited to industrial, commercial and domestic loads, it implies that other loads, such as railroad electrification, have known load characteristics and are being supplied under conditions which fit into a utility's entire business. In like manner, the shapes of load curves must be known, and the prices of competitive fuels must have been determined.

The Rough Formula

If it is assumed that for a number of years to come the shapes of load curves of industrial and com-

*Abstracted from paper to 1939 convention of the Edison Electric Institute.

mercial classes of service will remain practically unchanged notwithstanding changes in the volumes of these classes of business; if it is further assumed that the major change in the domestic field will be due to the acquisition of electric range and off-peak water-heater loads, on the basis of the most economic relation between them, which, for the specific case being studied, approximates two ranges to one off-peak water heater; if it is also assumed that the volume of commercial sales will about equal those of the domestic class, and if reasonably good business conditions can be anticipated, then the best economic balance between the loads of these classes is obtained when the annual kilowatt-hours of the industrial class are between two and three times the sum of commercial and domestic sales, gradually approaching the lower figure as the volume of domestic sales increases.

Objections

At once, of course, there come objections to any such analysis. It is apparent that business depressions will recur, that rate changes, often involuntary and improperly directed, may be made within each class of service, that business will be available that must be taken regardless of its effect on load characteristics, and that general desires of a market are not subject to rigid control.

Nevertheless, the direction of sales pressure should be toward the building of load which sets up a trend toward the goal. Whatever the degree of accomplishment may be, it will represent improvement. Disregard of this need for directed, intelligent sales pressure will invariably result in uneconomic distortion of the load relationships of customers within classifications and between the several classifications themselves. It will adversely affect net income.

Balance Changes

Load building within each class of service, in general, should be directed toward improving the class load factor, unless the results of such an improvement affect adversely and substantially the economic balance between classes of service. If such a condition is true, it is often possible, through properly directed sales effort, to arrive at a new balance equally as desirable as the former one. On the other hand, business of customers with low load factors may not be undesirable under all conditions of operation and, conversely, loads of customers with very high load factors may not be desirable at all times. The important point is that the sales effort should not be toward quantity of business only, but should intelligently follow a plan leading to a more balanced system load.

Still another phase of the load-balancing problem within a particular customer classification is presented by the so-called profitable and unprofitable customers. These are usually found in the domestic and commercial classes, within each of which there may be one or more rates. Customers will cluster in groups along these rate curves, in locations dictated by ease of selling, unless the sales effort is directed definitely toward balancing the use of the rate. While there can be no question that it is important to increase the electricity use of the relatively prosperous profitable customer who has been completely sold on the value of the utility's service, it is even more important to bring the low revenue, less prosperous customer and the unprofitable customers into the frame of mind which causes them to admit the economy and desirability of increased usage and ultimately results in substantially increased sales to them.

Selective Selling

The unprofitable customer is not by any means limited to the low-use or minimum-bill consumer. Particularly during recent years, pressures entirely beyond utility control have created areas in many rates which represent unprofitable business among larger volume users of electricity. Selling should be directed to avoid such areas or to remove customers from them to more desirable operating conditions, until such time as these undesirable rate conditions can be changed or until overall load characteristics become such that a new and satisfactory balanced load condition makes them compensatory.

Perhaps the only thing that does not change with respect to obtaining, in any utility, the closest practical approach to balanced load building is the fact that the method of approach to the problem must constantly change. There is no single path, no matter how perfectly it may be outlined today, as the result of highly comprehensive studies, that will lead infallibly to the point of maximum balance in load. Whether within or beyond our control, conditions will change tomorrow, and the utility sales program must be revised, not suddenly, but in a manner soundly based upon accurate knowledge that will lead back to the path of balanced load building. Such procedure, without doubt, is most in the public interest, is of greatest satisfaction to the utility's employee group, and is the producer of maximum return to investors.

William J. Hagenah, Public Utility Engineering & Service Corp., and Bernard W. Lynch, Standard Gas & Electric

George N. Tidd and H. M. Sawyer of American Gas & Electric

Progress in Rural Load Building

Offer appliances that will fit pocketbook of rural customer — Don't try to sell him what he can't afford — Make it easy for him to pay — And watch the load grow

H. E. DEXTER, ***Vice-President Central Hudson Gas & Electric Corporation****

HOW IMPORTANT is the farmer to us electrically? In 1935—the last figures readily available—our 6,812,350 farms had 31,800,907 people living on them, or approximately 25 per cent of the population of the United States; 12,407,614 of these people were agricultural workers and represented 24.4 per cent of all workers in the country.

Now this looks like a whale of a market; on the other hand, there are certain very definite handicaps due to low farm income. If we omit the World War period, 1929 was the peak year for farm income in the United States. As contrasted to this, farm income dropped in 1932 below any year since 1909. In 1935, with slightly more than 24 per cent of the population living on farms, agriculture accounted for less than 15 per cent of the national income.

While these figures do not present an alluring picture from a statistical viewpoint, there is a real market for electricity on the farm if we understand it and know how to sell it.

Due to the fact that the greater part of this rural market is limited by inability to pay for equipment, the most successful approach seems to depend upon our trying to supplant present sources of energy by electricity rather than to use the social aspect and attempt to sell a customer upon an entirely new standard of living. If we supplant present sources of power with electrical energy and do it for the same overall operating cost that the customer previously paid, we haven't taken anything away from him, and we haven't made him find any new source of money to pay for electricity. On the other hand, electricity, with the possibility of its automatic

H. E. Dexter

operation, generally will supplant enough labor on the part of the owner, his family, or his hired help, to make possible more time either for additional productive effort or for leisure, which eventually tend to better both his economic and his living conditions.

Sell Him What He Wants

For example, every rural resident, whether he be a farmer or just a rural dweller, has some need for hot water, a little refrigeration and some cooking. Why shouldn't it be done electrically? I do not mean by this that we need to sell the man an expensive range, a large storage water heater installed in his basement, or even the conventional refrigerator. There is a place for all three of these appliances, but not in every home. We all have many thousands of customers who cannot get the money to buy the present conventional equipment. Easy terms or rental plans may widen the market slightly for the present equipment, but it is not the answer for the great mass of our low-income customers.

Many thousands of these low-income customers today are entirely content with a teakettle of hot water three times a day. The way to do this job electrically is with some sort of an electrical device that will give them just that service. These customers do not have the money to buy the standard hot water storage system. When we find the answer to that problem—whether it be the electric teakettle or the 1½-gal. non-pressure water heater, or some other device—we can sell electric hot water service to our customers and the rate for electricity will not have to be 8 mills.

The same thought can be applied to cooking, dairy barn water heating, electric refrigeration, and the many other rural uses for electricity.

All Over the Farm

As the home is common to both the farmer and the rural dweller, to both the irrigated and non-irrigated farm, let's look at how this idea might be applied to the kitchen of a very low-income customer who will be content with a roaster-broiler-top burner combination at $36.50, an electric teakettle at $6.95 and a refrigerator at $77.95, making $121.40 as a base price. Now, as the income level of the customer increases, other features can be added. For example, the next step in water heating is the 1½-gal. non-pressure water heater, which costs $23.50, making the cost of the complete electric kitchen $144.90.

Now for the low-income market you shouldn't overlook the idea of meter selling, using meters that take nickels. Nickels are small change—

*Abstract of paper to 1939 convention of the Edison Electric Institute.

every one is careless with them. Why not capitalize on this fact? This complete kitchen equipment is being sold in my area at two nickels a day, and the customers like the idea. As an indication of the possibility of meter selling, you might be interested to know that today, in our third year of meter selling, we are picking up from this device 250,000 nickels per month, or approximately 3,000,000 per year.

This equipment, although it looks small, will do all the cooking, furnish all the hot water and refrigerate all the food used in most low-income homes. These folk don't need large refrigerators—they only need to preserve the left-overs from Thursday night until Friday morning—a small amount of butter and milk—and the food for Sunday from Saturday afternoon until Sunday noon. They just don't have the cash to buy in bulk. Neither do they need ice cubes or means for making frozen desserts. These items are luxuries which they can perhaps have some time when they can afford to step up to a larger refrigerator.

Keep Costs Down

In the winter time, in the colder sections of the country, it may be good business to suggest to the customer that the electric teakettle be kept full of water and allowed to set on the wood stove (there are a number of them in use), and only use the electric unit for the final boost in temperature when the water is needed. This helps to reduce the operating cost for your customer. It gives us some added kilowatt-hours at a profitable price, in this very low-income market, and widens the field for heating water electrically.

This equipment is all plug-in equipment, wiring difficulties are reduced to a minimum, the problem of additional capacity is eliminated on the part of the utility, and you have equipment that can be sold en masse to our income customers.

How It Works Out

The question now is—just how effective this kind of equipment can be in building rural load for the utility. Well, here are a few figures from the company which I am connected with, which are an indication of the possibilities in this field:

The increase in sales of kilowatt-hours to farms was 13 per cent in 1938 over 1937, and farm incomes were down—no fooling! The figure at the end of the year was 1,769 kw.-hr. per farm customer against the national average for non-irrigated farms of 1,045. The average price per kilowatt-hour to the farmer was 3.71 cents, against the national average of 4.5 cents per kilowatt-hour. But the "take" per farm for electricity was $65.72, against a national average of $47.03.

You don't need spectacular, expensive methods to sell this market. The maximum sales results seem to depend:

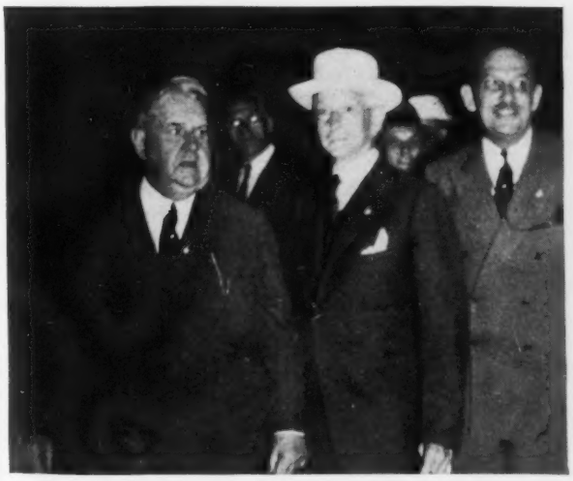
(a) Upon the adaptability of the device to the customer's needs.

(b) Upon the customer's acquaintance with it.

The entire rural market of our company consists of 25,141 customers, 6,000 of which are farms; the average annual usage was 1,200 kw.-hr. per customer and the average revenue $52.25. Last year, in one year alone, we sold approximately 10 per cent of these customers electric cooking and 3 per cent of them electric water heating, all on our regular rates. These rates are not particularly high; they follow our costs. They are perhaps a little bit better form than some rates available, and perhaps follow our costs a little more closely. On the other hand, the principal reason for our high average rate is the fact that our sales have been taken on in the low-income areas rather than in the high-income areas where the follow-on blocks of the rate are lowest.

Low Cost Revenue

One of the recent issues of ELECTRICAL WORLD showed that most of the companies throughout the country were spending from $1.05 to $1.10 per dollar of revenue added to its lines, and that the average rate per kilowatt-hour for this energy was 1.35 cents per kilowatt-hour, whereas our company spent $1.13 per dollar of revenue added, but added this revenue at 3.43 cents. The difference between these two rates does not necessarily represent a tremendously high increase in total bill, because in one case the installation represented an inefficient application of electricity to the customer's problem, while the other represented efficient use.



Thomas N. McCarter, Senator Edmund W. Wakelee and Charles Kugler of Public Service Corporation of New Jersey

Merrill H. Skinner, Buffalo, Niagara & Eastern Power; Matthew O. Troy, General Electric, and Charles A. Tattersall, Niagara Hudson Power

The Case for Purchased Power

The isolated steam plant is still the major competitor of purchased electric service — Popular interest has greatly exaggerated competitive significance of the Diesel engine

H. M. SAWYER, *Vice-President American Gas & Electric Company**

THERE is a tendency on the part of the electric utility industry as a whole to view with some alarm and apprehension the effect of present-day isolated plant competition. My own personal reaction has been that the basic facts do not justify a pessimistic outlook, and the imaginative evils which some view as a future possibility need not and probably will not obtain. On the contrary, I feel that an impersonal analysis of the competitive situation today and a review of the facts surrounding the growth of the industry should strengthen our confidence.

The very life blood of central station service has been this ever-present isolated plant competition and the industry's struggle for expansion, growth, and very existence was a healthy condition, supplying the basic motive for constant improvement and advancement. The electric utility industry's answer to this competition was, and, I am convinced, always will be, constantly improved service, lower costs, new developments in appliances contributing to the health, happiness, welfare and profit of the customer, improved efficiencies and an aggressive and tireless process of not only selling but actually educating the public to the advantages of its service and product.

The growth of the industry in the face of this competition is certainly indicative of the value and soundness of the basic principles of central station service. We offend all tenets of logic if we suppose that such growth and such expansion come about other than as the natural result of basic and inherent advantages peculiar to central station service, and it is permissible further to contend that those same advantages exist and are a definite part of our structure today.

*Abstracted from paper to 1939 convention of the Edison Electric Institute.

H. M. Sawyer

Study of Diesel Competition

The time, study and consideration given by the electric utility industry to the analysis of Diesel competition is to be commended, and yet a broad picture of the situation in its entirety does not by any means supply the relative justification for such intensity of effort. To avoid possible misinterpretation, I desire definitely to state that I heartily agree with and commend such an aggressive preparation for the meeting of any competitive situation, but I also feel that our mental reactions give an importance to the possibilities of Diesel competition that are inconsistent with the actual data and figures, as well as the basic fundamentals involved. It might be well to review the entire competitive situation over the past two decades, limiting it to this period in order that the Diesel figures might be made available.

As an index of the growth of Diesel power, we have the following record of total sales as reported for all stationary installations. It is unfortunately impossible to eliminate from these figures the horsepower of those installations which replaced existing Diesel installations. Due to the recognized short economic life of this prime mover it is my opinion, however, that these replacement installations form an appreciable percentage of the total listed below:

Total reported Diesel sales (stationary installations).

	Hp.		Hp.
1925	305,563	1933	66,505
1927	252,228	1935	509,489
1929	292,148	1937	592,505
1931	143,565		

In considering steam prime movers over the same period, we are forced to include in our figures the installations in central stations which, of course, will again, in this instance, constitute an appreciable percentage of the values given below:

Total reported stationary steam prime mover sales (reciprocating, turbine and turbo-generator).

	Hp.		Hp.
1925	1,308,061	1933	675,271
1931	992,078	1937	1,680,245

During a like period, the sale of electric energy by the electric utility industry to those customers classified as commercial, small power and industrial power customers, was as follows:

	Kw.-Hr.		Kw.-Hr.
1926	41,478,000,000	1934	49,212,000,000
1928	49,407,000,000	1936	64,267,000,000
1930	54,092,000,000	1938	63,214,000,000
1932	43,070,000,000		

These data permit many interesting studies, but the significant trend is reflected by the fact that stationary Diesel sales increased in 1937 by 286,942 hp. over the sales for 1925. Steam sales for stationary applications in 1937 showed an increase of 372,184 hp. over the sales for 1925, while central station service sales to

commercial, small power and industrial customers increased 21,736,000,000 kw.-hr. in 1938 over the sales for the year 1926.

Steam the Strongest Competitor

An unbiased examination of these figures certainly does not justify the importance that we, as well as the general public, are prone to attribute to the Diesel engine and its potential effect as a competitor. On the contrary, it would seem that our chief competitor is still steam and that central station expansion has occurred along lines that are not approached by either of the two competitors.

In my own company our statistical records tend to corroborate the general trend of these figures. In 1938 the total affiliated companies lost 663 kw. in load to Diesel and 3,050 kw. in load to steam competition. In the same interval (1938) the same companies replaced 182 kw. of Diesel load and 3,525 kw. of steam load. These figures represent only replacements and do not reflect the new business secured during this period against keen competition. The Diesel engine contributed to a major extent to this competition, and yet the above totals become relatively insignificant if we appreciate that during the year 1938 our companies secured 43,496 kw. in new and increased load.

The Diesel an Opportunity

With the firm conviction that competition has been a vital factor in the growth of the electric utility industry, it would seem to me that the Diesel situation offers to us the opportunity to contact our customers on a scale heretofore not attempted. By contacting the customer, I mean to know, understand and appreciate his problems, to be able to talk his language, and in this manner render ourselves capable of extending the maximum in service to him. Many times a better understanding of his problems will increase our usefulness to him and tend to eliminate those factors of doubt which are certainly not conducive to a mutual understanding. He has many problems, the correct solution of which are necessary for his very existence, and I am convinced that we may well be able to assist in the happy solution of some of them. To know the customer better means likewise that the customer will know and better understand the electric utility industry. A better realization of our problems, policies and limitations will tend to remove the cause of many subsequent misunderstandings. More frequent contacts will further serve to give us knowledge of contemplated installations at an early stage, and we can all recount cases where we could have shown the customer, before it was too late, the results which were bound to follow his decision, had we known of the situation in time.

Diesel Has a Place

In all fairness, it would seem to me that the Diesel may quite possibly have a definite place in our national picture. The cost of the facilities required to render service to isolated consumers often makes the cost of purchased energy prohibitive and the utility in other instances cannot serve the customer under the then existing conditions. In still other cases, it may develop that due to the extremely hazardous or uncertain conditions under which the industry is operating, the utility could not take the risk of serving this customer without adequate guarantees which might not be economically possible for the customer to meet. And, finally, due to unusual operating conditions in certain locations, it may develop that the utility's rate structure will not effectively meet Diesel competition. In these and similar instances, the Diesel engine may justify its selection, and we should recall that the prime movers of the past developed and pioneered many of our present markets up to the time when the electric utility could and did replace these prime movers under competitive conditions. In the field of transportation the future of the Diesel seems assured and we may expect that scientific development and research in the mobile types of engines will be reflected eventually in stationary Diesels and offer us continued competition.

We should be constantly mindful of the fact that we sell a service and, if the value of that service is not commensurate with the value that the customer receives as a direct result of it or, if our charge for such a service is greater than the cost of duplication from another source, we cannot hope to retain such business, and I am sure we don't desire such business. Happily, however, we have been endowed with advantages which in general do not support such a condition, and, with the secure thought that the electric utility industry has survived and expanded under keenly competitive conditions in the past, the contemplation of what the future may hold for us in this respect is reassuring in that the necessity for those same principles conducive to improvement and advancement is assured.

C. E. Michel, Union Electric of Missouri, and Robert Tillman, Consolidated Gas, Electric Light & Power Co. of Baltimore

Raymond M. Waggoner, Hubbard & Co., and E. H. McNeill, Okonite

Increased Loading Permits Practical System Economies

This Kidder-Ford paper, with the title "Increased Loading of Apparatus and Lines Permits Practical Economies," was awarded the first James H. McGraw Prize for "the three most meritorious papers on any engineering or technical subject relating to the electric light and power industry"

A. H. KIDDER * *and* **F. R. FORD**,† *Philadelphia Electric Company*

WHERE PRACTICAL the policy of above-rating operation of the major facilities of an electric light and power system is quite definitely effective in postponing the installation of equipment in existing uncompleted stations and also of new stations where adjacent stations have become loaded to near their original rated values. It is difficult to estimate the savings made possible during a given period by above-rating operation. However, application of emergency ratings throughout a system involving some 100 substations and several hundred lines and circuits will result in very large savings as the system load continues to grow.

Effect on Equipment Life

The increased average loadings which are made possible through provision for above-rating operation will, of course, decrease to some degree the life of the equipment as compared with what would be obtained if the equipment ratings were never exceeded. Even in those cases where the above-rating operation is on the basis of accepting slightly more than normal life loss, however, the average loading will be appreciably below the rated capacity of the equipment and the average life should be at least of the order of the 20 to 25 years which is usually considered normal.

The economic gain from emergency ratings as adopted will still be very large, even under the most pessimistic situation we can now conceive. Should above-rating operation reduce the equipment life to the order of, say, fifteen or even twelve years, the value of the equipment affected often represents less than 15 per cent of the total substation cost.

While above-rating operation has not been used long enough as yet to prove that its effect upon the life of equipment is of the negligible values determined by intensive experiment and analysis, there is reasonable doubt that the results will be other than contemplated. In fact, the present emergency ratings are based on certain assumptions which involve such margins of conservatism that experience is expected to show that the loadings can be further increased in some cases.

Attainment of the lowest practicable investment costs requires that each load-carrying unit in the supply system have as large a load as it may carry without any compromise in the present high standards of voltage regulation and service continuity. The basic importance of maintaining continuous power supply, coupled with the need of providing capacity for load growth, often requires load-carrying units in the supply system to operate under conditions such that the sum of the normal maximum demands on these units is less than 60 per cent of the sum of their nameplate ratings. Most of the resulting "idle capacity" is held in reserve to permit the supply of continuous service; that is, held available for use when units fail or are taken unexpectedly out of service.

This paper attempts to outline the results of the investigations conducted by the Philadelphia Electric Company in the light of the foregoing situation during the past ten years. The results accomplished to date relate principally to determining load ratings for substation supply lines, transformers, voltage regulators, distribution circuits and transformers, or that large group of facilities which constitute the distribution system.

Substation Bank Loading

Nearly all of the additions to distribution plant investment are made to provide for the supply of load growth and to maintain, or improve, service continuity. Perhaps it would be helpful to illustrate the importance of these two factors by discussing their effect upon substation transformer bank loading. Let us say that the load on a substation in one year is just equal to the normal load capacity of two transformer banks. A third or spare bank is provided in order to have two banks available to supply the load, should one fail. In the following year, however, a small increment of load growth requires the installation of an additional transformer bank and in that year the four banks are needed to carry but little more than a two-bank load. In the course of a few years load growth will gradually absorb the spare capacity until a time is reached when the load on the substation will very nearly equal the capacity of three banks. During the interval between the installation of the fourth bank and the time when its entire capacity would be required for adequate reserve, then there has been an average excess transformer capacity above load that is about equal to one and one-half transformer banks. Stated in more general

* Assistant engineer system planning, transmission and distribution.
† Assistant engineer, inside plant.

terms, this amounts to saying that each substation which has (n) identical banks of transformers in service and a growing load will have an average of 1.5 banks of excess capacity, and the ratio (r) of the installed capacity to the average yearly maximum demand on the substation is:

$$r = \frac{n}{n - 1.5}$$

This ratio holds for any group of three or more identical lines, transformers, circuits, etc., so long as the number does not become large enough to justify consideration of coincident emergency loss of more than one unit in the group. In each part of the distribution system we find we are dealing with groups of units in which the values of (n) range from 2 to about 7. By substituting such values in the foregoing equation we may find directly that the resulting ratio of emergency load rating to the average yearly maximum demand per unit ranges from 4 to 1.27 for each such group. That is, that the service continuity and load growth considerations require providing from 300 per cent to 27 per cent of capacity in excess of that which would be required if these two factors were not inextricably present in a growing electricity supply system.

No. of Units Normally in Service	Ratio of Emergency Load Rating to Average Yearly Maximum Demand per Unit
2	2 to 4.0*
3	2.0
4	1.60
5	1.43
6	1.33
7	1.27

* Formula not entirely satisfactory for this case.

Once the full significance of these factors is appreciated, it is a simple matter to explain the wide margin between capacity installed and the sum of the normal non-coincident maximum demands in each part of the supply system.

Avoid Excess Investment

Unless special care is taken, therefore, this characteristic of supply system design may be responsible for a considerable excess of investment. Its presence cannot be avoided. However, the effect upon investment in load-carrying facilities can be controlled, to a large extent, by judicious application of emergency load ratings that are somewhat higher than the load ratings which would represent sound engineering practice for regular daily operation. The foregoing table is helpful also in illustrating the ratio of emergency to nameplate ratings which would be required in order to bring the average yearly maximum demand up to a value equal to the installed nameplate rating of each group of two or more units normally in service. Ratios as high as 1.6 and 2.0 would represent hopeless requirements, however, if emergency loads and their effects upon operating temperatures did not differ materially from normal load conditions.

Emergency operations differ from normal conditions chiefly in two respects:

1. Emergency loads are transient in nature and, usually, short-lived.
2. The probability is usually very remote that an emergency will occur at the time when loads, ambients and the limitations of installed capacity would combine to require operation of the equipment at the highest possible temperature which is selected as the design limit.

For both normal and emergency conditions, nearly all loads are variable in their nature rather than constant. Hence, the maximum temperature reached lasts for a very short time and is in most cases considerably lower than would obtain if the usually appreciable thermal capacity of the apparatus were not present to reduce the temperature changes that accompany changes in load.

Operating Temperatures

The problem of increasing load ratings, therefore, reduces to consideration of such factors as the operating temperatures to be expected and their possible relative effect upon the life of the apparatus in question, as determined not only by the temperature-life characteristics of the apparatus, but also the probability of occurrence of transient loads sufficient in magnitude to require operation at above rated temperatures.

Research by the electrical manufacturers to determine more accurately the limits of loading of their major apparatus has now corroborated our own belief that much of the electricity supply system may

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Winners of the coveted James H. McGraw Award for the "three most meritorious papers on any engineering or technical subject relating to the electric light and power industry"

A. H. Kidder and F. R. Ford, Philadelphia Electric, first prize—"Increased Loading of Apparatus and Lines Permits Practical Economics"; H. H. Johnson and M. S. Umbenhauer, Consolidated Edison Co. of New York, second prize—"An Effective Load-Dividing Device—Makes Economic Division of Power Generation Simple, Rapid and Economical"; St. George T. Arnold, Boston Edison, third prize—"Some Principles and Practices of Modern Distribution Design—Suburban Load Densities." Left to right—Mr. Arnold, Mr. Ford, S. B. Williams, editor of "Electrical World"; Mr. Kidder, Mr. Johnson and Mr. Umbenhauer

G. C. McNeill (left), Boston Edison Co., head of the Woburn division of the transmission and distribution department crew of 37 men, winner of the Matthews Valor Award, and George C. Matthew, donor

be operated at emergency loads sufficiently high to permit a 16 to 60 per cent increase above the usual average daily loads, without facing the likelihood of incurring any appreciable reduction in the normal life expectancy of the equipment affected, or excessive voltage regulation.

Harold L. Martin (right), manager of Modern Kitchen Bureau, presenting the R. B. Marshall award for range sales to Kenneth DeLate, Idaho Power Co.

Specific Example of Above-Rating Application

Transformer Banks—An example of possible gains to be made through above-rating operation is represented by the case of a typical urban distribution substation which is designed for a maximum of four 7,500-kva. transformer banks with twelve incoming and eight outgoing 6,000-kva., 13.2-kv. lines and a 12,000-kva. emergency tie line to another substation. The complete installation includes 31 2.4-kv., two-phase, three-wire distribution circuits.

With the original basis of design the maximum distribution load which could be supplied was the output of three transformer banks at their nameplate rating, or a total of 22,500 kva. The full capacity of one bank would be required as reserve in case of failure of one of the banks. The distribution circuits could be loaded to only about 70 per cent of their rating, in order to maintain a margin for diversity and for taking on extra load through failure of equipment on an associated circuit. The total rated capacity of the 31 200-amp. circuits, as was considered the probable ultimate in the original design, is approximately 32,000 kva. and the actual load (at an average of 70 per cent loading per circuit) is about equal to the 22,500 kva. of firm transformer capacity.

The capacity of these transformer banks has now been established at 9,000 kva. normal and 12,000 kva. emergency each, which gives a firm load-carrying capacity of 24,000 kva. with a three-bank installation and 36,000 kva. with a four-bank installation.

Circuit Ratings—It has also been found possible to apply emergency ratings to the circuits in which the induction voltage regulators are the limiting factors, so that the 200-amp. circuits can carry 250 amp. for occasional emergency four-hour periods. The underground cable portions of these circuits generally can take about all the load that the regulators can supply. There has been a considerable number of 300-amp. circuits installed in the past few years, with a growing tendency toward this larger rating. The 300-amp. circuits can carry 375 amp. for occasional four-hour emergency periods. This amounts to emergency operation at 25 per cent above nameplate rating for periods of four hours. Furthermore, to provide additional flexibility for emergency cuts of load from a faulted circuit to adjacent circuits, preliminary consideration indicates that we should soon find it practical to operate many substation circuits at 150 per cent of nameplate rating for about two hours, to be followed by 125 per cent for two hours.

The emergency ratings already in effect permit individual circuits to be loaded up to their nominal ratings normally with a margin available to take a share of the load from a circuit which has failed. Through such increased normal loading on a considerable number of circuits in a substation the total normal load can readily be made as large as the 36,000 kva. total rerated transformer capacity. This is approximately 60 per cent more than the originally designed distribution capacity of 22,500 kva.

In keeping with the increases in emergency capacity of the substation transformer banks and distribution circuits it has been found possible to make substantial increases in the ratings of the 13.2-kv. lines. The various 6,000 kva. lines have generally been given a four-hour emergency rating of 7,000 kva., and it has further been determined that one-half hour loadings at least as high as 9,000 kva. are feasible, with the possibility of going to 12,000 kva. for this short period under emergency conditions. The usual cable size in this service is 3 × 350,000 circ.mil.

Increment Cost of Substation Kept Low

But whatever may be the condition, even with the maximum equipment changes which may be necessary, the unit cost for the increased capacity is very small compared with the unit cost for the substation capacity as a whole. Cost of the complete substation on the original design basis is approximately $1,100,000, the total substation supply capacity being 33,500 kva. in outgoing 13-kv. load and 22,500 kva. firm capacity in transformer banks for the supply of distribution circuits. Thus, the cost per kva. for the combined service is $19.60. The cost of the increased substation capacity due to application of emergency ratings to the facilities on the new basis will not be more than $20,000, assuming that the complete installation had been made before the application of the emergency ratings. In new installations provision can be made for the emergency operation at virtually no increase in cost over that which would obtain with the original design basis.

With the emergency ratings applied to all of the substation facilities, the total capacity becomes 39,000 kva. for the 13.2-kv. load and 36,000 kva. firm capacity of transformer banks and circuits. The effective increase in capacity amounts to 19,000 kva. at a cost of $1.05 per kva.

Other Applications of Increased Ratings

Similar analysis has led to increases in ratings of large 3¾-kv. transformer banks, small single-bank substation transformers, 2.4- and 4-kv. distribution transformers (up to 235 per cent in emergencies), 13.2-kv. lines and tie lines, 2.4- and 4-kv. distribution circuits, disconnecting switches. Ambient winter temperatures for typical outdoor transformer installations are taken as 10 deg. C. and 30 deg. C, for summer, the latter including the sun effect of 6 to 8 deg.

One Kilowatt-Hour

For doing work, the human muscles can't compare with electric power — A man-day of work is only a small fraction of the work a kilowatt can do in the same time

C. M. RIPLEY, *General Electric Company* *

TO ME the most helpful, thought-provoking idea ever written about electricity appeared in *Popular Mechanics Magazine* in an article called "The Home That Runs Itself," written by H. W. Magee of its staff. The sentence was:

"When you buy electricity you buy work."

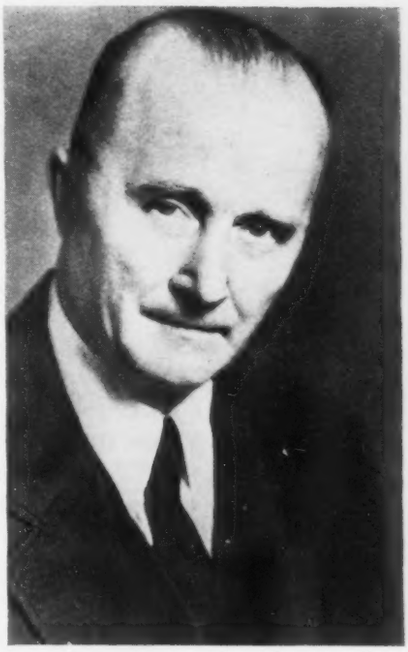
To me this idea was as startling as a flash of lightning on a dark night. For 40 years I was sure nobody knew what electricity was. And Dr. Steinmetz said he didn't know. And Dr. Whitney, founder of our research laboratory, said he didn't know. And then up pops *Popular Mechanics* and says it's *work!*

No man can make a kilowatt-hour in a day with his muscles alone.

To learn the value of anything, just try to make it yourself. Two years ago we built a stationary bicycle that drives an electric generator. Any one who pedals the bicycle-driven generator soon gains a very, very, wholesome respect for the work in one kilowatt-hour. I rode it hard for one minute and was breathless. The electricity I made was worth 1/40 of a cent, or the price of one safety match; that's what I'm worth as a power plant. But I'm only a novice.

At Madison Square Garden a champion six-day bike racer pedaled this same machine in a desperate sprint of one minute. The meter showed he made 0.0018 kw.-hr. If he and his team-mate had kept up this sprint for six days and six nights (impossible, of course) they would together have made 78 cents worth of electricity, poor pay for a week's work for two famous athletes. It wouldn't even pay for their coffee!

And at the Better Homes Show in Billings, Mont., 213 people rode this machine until they were tired, and their combined work was 2½ kw.-hr., worth 10 cents.



C. M. Ripley

In Schenectady we set up an efficient hand-driven generator that made 60 watts. Few men turned it more than a minute. A strong young porter, formerly a pugilist, accepted my offer of $12 an hour as long as he could keep the 60 watts of lamps burning. He quit, exhausted, in just thirteen minutes. When I asked him why he quit, and reminded him his wages were $96 a day, he gasped: "The money wasn't—worth the work." He was fagged out in the making of 1.3 per cent of one kilowatt-hour. It would take at least two men grinding eight hours a day for three weeks to make one unit of electricity that way, and at $5 a day wages for each the cost would be $100.

One kilowatt-hour is always more work than any man can do in a day.

This is true no matter how strong or ambitious the man, and no matter what the task, and no matter what the wages, inducement, honors or bonus. Engineers have measured in foot-pounds the work that all kinds of laborers can do in one day. They have done it in the U. S., England, Scotland, France, Egypt and China. These jobs included lifting weights by hand, by hod, by wheelbarrow, by rope and by pulley; also turning cranks, shoveling, towing canalboats, hammering and pumping, sawing, rowing and pushing on a capstan.

Not One Man Could

The engineer's reports I have seen are unanimous in one respect: Regardless of race and climate, in Orient or Occident, in this century or the last—not one engineer ever found any man, either laborer or athlete, that did the equal of 1 kw.-hr. or 2,655,200 foot-pounds of work in a day, and some worked ten and even twelve hours per day, as in China and Egypt.

Their day's muscle work averaged only 28 per cent of 1 kw.-hr.

So people waste money if they have jobs done by muscle power for any length of time. Dr. Steinmetz said: "The electric way is always the cheapest way." This is even more true in the home than in industry.

The average power which a man can exert all day is 35 watts.

This information was gained by changing the foot-pounds in the measured day's work into watt-hours and dividing by the hours worked. The fact that they average only 35 exposes the widespread fallacious belief that a workman can average 1/10 of a horsepower and keep it up all day. He can't do half that at the average task. What they were able to maintain varied from nine

[*Continued on page 136*]

* Abstract of talk to 1939 convention of the Edison Electric Institute.

Editorials

S. B. WILLIAMS, *Editor*

First Major Setback for Public Power Bloc

TVA and the public power bloc received their first major setback on Tuesday when the House cut the hundred million asked for to sixty-one-and-a-half millions and limited the authority's area of operations.

A sufficient sum to purchase Tennessee Electric and some other properties has been allowed, but no more. The House by that action refused to give TVA *carte blanche* to expand its operation without first asking for permission from Congress.

In circumscribing the area of TVA activity, the House removed an ever-present threat to private operation in the Southeast and gave to investors generally a tangible basis for restoration of confidence in the utility industry.

The bill also, in providing for a bond interest and retirement fund, for supervision of accounting by the General Accounting Office, for repayment to the government of expenditures for electric property and for TVA financing without government guarantee of interest and principal, places the authority in a position where its fiscal policy will be less shrouded in mystery and doubt.

The only other thing, besides fair allocation of costs, required to make the "yardstick" reflect the costs of government operation is the matter of taxes. The bill specifically prohibits TVA from making up the tax loss from the sale of private utilities, leaving it to the several states to recover such revenue from the consumers. However this is done, the public will soon learn that there is no Santa Claus.

While the greatest beneficial effect undoubtedly will be felt first in the Southeast, the precedents established in this bill should be such as greatly to reduce the competitive dangers elsewhere from other government-owned hydro projects. Moreover, it is conceivable that these limitations on public power might provide the necessary incentive to co-operation between such projects and private utilities.

It has been said repeatedly in these columns that private companies provide the best and most economical means for distribution of federally generated power. The government has built its hydro projects in areas lacking a ready market for the extra energy. The utilities, with their load-building departments, are by training better equipped to dispose of this power.

Of course, the bill so far has passed the House only. The Senate allowed the full hundred million without these restrictions. Which will prevail or what compromise may arise is a matter for speculation. The news so far, however, is most encouraging to those who believe that the utilities, given a chance, can be the lead-off for expansion in the capital goods market.

All-Employee Selling Wage and Hour Act Ruling

A NUMBER of letters have been received from utilities in different parts of the country asking if the editorial in the April 22 issue of ELECTRICAL WORLD entitled "All-Employee Selling Runs Afoul of Wage and Hour Act" was based upon a regularly issued ruling. It was based upon an oral answer to our question by the Administrator and the chief of the opinion section.

In view of the interest, however, we have asked for a written reply, and we have the following from Joseph Rauh, chief of the opinion section:

"The Fair Labor Standards Act applies to employees engaged in interstate commerce or the production of goods for interstate commerce. If an employee is so engaged for any part of the work week, he is subject to the provisions of the act for all the hours that he works during that week. This is true even though the employee spends part of his time in work which could not be considered as interstate work or in work which is exempt, such as time spent in a 'local retailing capacity' under Section 13 (a) (1).

"Section 3 (g) defines the term 'employ' to include 'to suffer or permit to work.' It seems entirely clear that an employee is working during the time that he is out selling bulbs and electrical appliances for his employer. Accordingly, if such selling is carried on with the knowledge or approval of the employer, the employee would be 'suffered or permitted to work' within the meaning of the definition.

"The implication that the act prohibits employee selling seems misleading. Employees may not only continue to sell, but such employees can still be paid on a commission basis during the time that they work in the selling campaigns. All that the act requires is that for such hours they receive the minimum wage and, if these hours result in a work week of more than 44 hours, that the employees receive the statutory overtime compensation. The way that you would figure the overtime compensation in such case is to take the weekly earnings, including the commissions, and divide the figure either by the regular number of hours worked, or, if there be no regular

number of hours worked, by the hours worked each week. The resultant figure, the regular hourly rate of pay, would have to be paid for the 44 hours with time and a half for each extra hour."

There was no intent to say, and as we reread the editorial of April 22 we could find that there was no statement, that all-employee selling was not permitted under the act. It was our belief, and this has since been confirmed by several utility men, that if all-employee selling after hours had to be compensated for at overtime rates, then it could easily become too expensive to warrant its continuance. In that way would it come to an end.

A Universal Transformer Mounting

GENERALLY successful results are reported for the farm type of transformer which is provided with two mounting lugs in vertical arrangement, permitting the tank to be attached direct to the pole. That experience has prompted, very naturally, the suggestion that the idea be extended to all distribution transformers and in such manner as to afford complete interchangeability between crossarm and pole mounting and for all makes.

This, in fact, is another item of the activity of the joint EEI-NEMA committee on standards for distribution transformers and represents an added objective in the program to nibble continuously at prevailing costs of distribution through the route of standardization and interchangeability. Time after time it has been asserted that no spectacular reductions are likely to be effected in distribution costs and that the very diversity of the problem necessitates a piecemeal attack and contentment with a multiplicity of small gains.

Standardization as a rule reduces the manufacturing cost not only because of reduction in the number of variations produced, stocked and shipped but also because of the greater simplicity in handling the whole process and transaction. Utility users make a corresponding gain through having available stock equipment with the flexibility for use in a multiplicity of situations. It would seem logical, therefore, to support a movement which shares savings that contribute toward a lower investment in facilities per utility consumer.

Specifically, the current proposal is to provide the two mounting lugs arranged vertically for direct bolting to the pole without reliance on a supporting crossarm or "kicker" arm. If, however, a crossarm is in use or required, an accessory is provided to facilitate conventional suspension from the arm and a "kicker" extension to perform the function of the "kicker" arm when omitted. "Jump-proof" fastenings is an agreed requirement. Two-point fastening to the pole, in either type of construction, assures a firm cling to the pole to resist the bouncing characteristic to which transformers are subjected when poles are bumped by errant motor vehicles. The transformer must stay on the pole after the episode.

Adding to this the trend toward elimination of unneeded winding taps in many ratings, the opportunity of standardizing the bushing arrangements with the expectation of modern proportioning of copper and iron losses, there can be seen the prospect of transformer patterns which will be well-nigh universal in interchangeability of mounting, training of leads and adaptability to current load cycles. This is the road to economies.

That modernization of transformer mounting is timely is borne out by the attention being given to this subject in other quarters. In evidence is the description by E. W. Dillard which appeared in the May 20 issue of ELECTRICAL WORLD of an improved transformer mounting as worked out for the New England Power Association. It is apparent that the objectives of Mr. Dillard and of the joint committee are closely the same. Independent thinking is always constructive, if results are urged at the proper stage.

Who Belongs in Public Relations Department

WHO is the public relations department of a company? One's first thought brings to mind the head of the department. An entirely different idea, however, was expressed recently at a McGraw-Hill Public Relations Forum by H. P. Liversidge, president of the Philadelphia Electric Company. He said: "I like to say in my own company that our public relations department is our largest department, because every one on our payroll belongs to it."

Of course, what Mr. Liversidge meant was that employees who contact the public in any way are the company to those people. The way the employees act, their courtesy and tact, the service they give, the answers they make to questions—all have a definite bearing on the way the public feels toward the company.

That, of course, is not new. When we think of these employees, however, as belonging to a public relations department, perhaps it gives one a clue as to what is necessary if public confidence and respect are to be merited. They must be trained in the duties of the department, just as the members of any other department are trained. It is not going to be enough to train just those people whose pay checks are charged against the public relations department.

Most utilities see this and are in accord, but there is so much to do they sometimes get bewildered and do not know where to start. This training cannot be done overnight. It is a continuous process. One must not let the size of the job get him down. Just make a start and keep it up.

Five Sides to TVA Purchase Authorization Bill

By CARTER FIELD

This noted journalist gives his personal comments and interpretations on current happenings affecting the electrical industry. His background and his location at Washington make his thoughts informative and interesting even though all may not agree with him

IT'S A TRITE SAYING that there are always two sides to any question. Generally there are more. For instance, the gentleman back in 1914 who said he was neutral—that he didn't care who licked the Kaiser!

But in the pending bill which would permit the TVA to buy the privately owned electric properties in Tennessee there are at least five sides, with sharply differing points of view.

Let's look at them. The elements here are of the essence so far as the electric business, the taxpayers and the government are concerned.

1. *The TVA itself.* It wants that $100,000,000 bond authorization. Part of it will carry out the agreement to pay for the properties of subsidiaries of Electric Bond & Share and of Commonwealth & Southern. But it is even more interested in acquiring a working fund estimated from $40,000,000 to $70,000,000, according to who does the figuring, which would permit expansions without further authorizations from Congress.

2. *The private utilities involved.* They want enough money arranged for to pay them off and let them out of ruinous competition with the government. They do not like that additional money put into TVA's hands, but naturally they are more interested in getting out with their shirts at the moment than in the continuance of a profitless fight against government ownership, so far as the Tennessee Valley is concerned.

3. *The coal operators and miners.* They are willing for the private utilities to be paid, though they do not care very much about that phase. But they are determinedly against permitting any further funds for TVA which might be used for more hydro power. Every kilowatt of hydro power to them spells less coal to be mined and sold from now on.

4. *The Tennessee state and local governments.* They are willing for TVA to pay for the properties, and they rather like the idea of more money being authorized, as presumably it will be spent in or near their communities. But their big objective is to force the writing into the bill of a clause which would compel TVA and all the other benefiting public ownership units to pay just as much into the state and local treasuries as the privately owned utilities would have paid in taxes.

5. *The public ownership group in Congress and the Administration.* They are willing to pay off the utilities under the agreements made, regarding the price as an outrage, but inevitable as apparently having been ordered by Roosevelt and Hopkins. But they are much more interested in that big jackpot which would be left over, to provide further expansions without running the gamut of an economy-talking — even if not practicing—Congress. For of course the non-Tennessee Valley groups just might seize upon TVA, as they did upon the Florida Ship Canal so recently, to prove to their own constituents how anxious they are to economize, if it does not come out of the bacon they are bringing home to grease the next election.

Of course none of these five groups have the interests of Honest John Taxpayer at heart as their primary motive. Believe it or not, his interests coincide with the private utilities. The agreements have been made, so he no longer has an interest in whether the price is right or not. Only to the extent that any more of his own money will not be wasted, or that public ownership projects will be compelled to pay the equivalent of taxes are his interests now affected.

Strangely enough, with all of these diversified interests, this bill passed the Senate with practically no consideration at all. It was not until it had got over to the House of Representatives, and been referred to a committee, that the fight really began. And it was not the utilities which put up the battle which resulted in the House committee scaling down the authorization for bonds so sharply; it was the coal interests.

As has been pointed out from time to time in these articles, no one has realized the absurdity of the government's ventures into the hydro-electric field so clearly as the men who have been Mr. Roosevelt's allies so consistently, the leaders of the United Mine Workers. One of the best speeches ever made against the loan and grant system of subsidizing hydro projects was made by John L. Lewis, then as now head of the United Mine Workers, back in the early days of the first FDR Administration. So when the coal operators got to work on Congress on this particular subject they didn't forget to quote from this particular speech, to show that the miners are with them.

Ticklish Bond Issue

Their prime objective, this time, to reduce that authorization for a bond issue, was highly successful in the House committee. The utilities had contented themselves with urging that the authorization for enough money to pay them off should be approved. They did not dare risk an open fight on the *additional* amount.

How much is that additional amount? As already stated, the estimates run from 40 to 70 millions. Here is how that figures out. The public ownership crowd, and TVA representatives, have been glibly mentioning the *total* amount to be paid to the Commonwealth & Southern and the Electric Bond & Share

[*Continued on page 137*]

NEWS OF THE WEEK

Power Activities of TVA Curbed by House Bill

Limits area in which government power agency is to operate and provides only $61,500,000 of bonds to consummate deal for purchase of properties of Tennessee Electric Power

A sharp curtailment of the power expansion activities of the Tennessee Valley Authority was written into the bill the House voted 191 to 167 this week when it authorized the TVA to issue up to $61,500,000 of bonds to carry out the deal with the Commonwealth & Southern Corp. to purchase the properties of the Tennessee Electric Power Co. and certain properties in northern Mississippi and northern Alabama.

The bill restricts the future power activities of the TVA to the area in which those activities are now being carried on or are to be carried on under the contract for the purchase of utility properties.

Provides Sinking Fund

Another section of the bill requires the TVA to set up a sinking fund for the amortization of the bonds before maturity and specifically prohibits the authority or the United States to compensate the states and political subdivisions served by TVA for loss of tax revenues resulting from the authority's power activities. The House bill refuses to allow the credit of the United States to be pledged for payment of the bonds or interest, but makes them direct obligations of TVA credit.

Proponents of TVA sharply criticised the action of the House in voting the bill sponsored by the military affairs committee. They contend that the bill, if enacted, will be the end of the C. & S. deal and so limit the TVA as to make it ineffective in its yardstick.

The tax provision prohibits the TVA from making any change in the percentage of payments now authorized in lieu of tax revenue loss to any state or political subdivision. It also leaves it to the states to recover any loss in tax revenue from the change from private to municipal utility operations by taxing those persons who are receiving the benefits of TVA "cheap" electricity.

Wendell L. Willkie, president of C. & S., stated that "the contract can be carried out under either the House or Senate bill. There are no provisions in the House bill that interfere with carrying out the contract. The passage of this bill should expedite, instead of retard, the carrying out of the contract." The deadline on the contract for the transfer of the Tennessee properties is June 20.

In attacking the TVA during discussions of the House bill, Chairman May of the military affairs committee, said that the TVA yardstick "is a robber at one end and a thief at the other." He warned the House that TVA nourished an ambition to reach out and drive private utilities from other cities.

"They've got their eyes on Louisville, on Cincinnati, on St. Louis and on Indianapolis. They've got their hands in the pockets of the taxpayers and there is no end to their ambition.

"Let us keep this monster within the area where it can sell every ounce of electricity. We can't let it run loose any longer."

The action of the House was hailed by critics of the TVA as a move to restore confidence of investors in the utility industry, since it limited TVA's power activities and field of operation.

Anticipating the action of the House, Senator Norris of Nebraska, father of the TVA, had attached a rider to the Administration's sponsored bill to remove the restriction on the national debt, an amendment which authorized the TVA to issue up to $100,000,000 of government-guaranteed bonds to consummate the C. & S. deal on the basis of a $76,800,000 contract purchase.

The two bills now go to conference, where details and adjustments are to be worked out.

In order to expedite the TVA-Commonwealth & Southern deal, Mr. Willkie has given assurance to municipalities that the contract will be extended for any reasonable period of time in order to allow the municipalities to arrange for financing of the purchase. This extension of time would be on the basis that there is a pro rata allocation of taxes from the original date of closing of the deal.

Mr. Willkie said that such an extension would allow time for discussion by Congress of the Norris-May bills and enactment of legislation.

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TVA Starts Work to Duplicate Line

L. P. Sweatt, vice-president of Mississippi Power Co., Gulfport, stated that TVA construction forces on June 13 started construction of a 44,000-volt transmission line from West Point to Starkville, a line duplicating existing facilities of the utility now serving Starkville.

He said that construction work began coincident with the passage by the House of legislation to prevent such duplication and at a time when active negotiations between TVA and Mississippi Power were in progress for purchase of facilities to avoid duplication.

Several cities in northern Mississippi have practically completed duplication of the company's distribution system using PWA funds.

Public Sentiment Change Encourages Utility Leaders

Feel optimistic over ability of the industry to meet attacks and work out problems successfully — Kellogg takes office as president Major Bennion as managing director of E.E.I.

A decided turn in sentiment regarding the outlook for the electric utilities was evidenced last week by industry leaders during the annual convention of the Edison Electric Institute. Encouraging signs were seen by many, and optimism overshadowed the pessimism related by those who operate in territories where subsidized government projects operate.

Many of the utility executives were more encouraged regarding the outlook than at any time in the past several years. There was evidence of a return of confidence in the strength and stability of the industry and its management to meet problems successfully.

Industry Is Encouraged

Industry leaders say that the utilities are beginning to feel their "feet" again after having been "rocked" by government attacks and punitive legislation during the past few years. Evidence is that the public is becoming "fed up" with the continued attacks which have caused a state of "fear" that has held back economic recovery and an increase of employment in industry.

Public sentiment is definitely turning toward industry, since it is felt that private enterprise will be called upon to pay for the failure of the Administration to bring about economic recovery and employment of millions of idle workers. Reports also indicate that the public feels that the spending honeymoon will soon be over, since the Treasury will be dry of funds available for subsidies to compete with private business.

While many utility leaders feel that their position has been strengthened by recent events, they see some trouble ahead, especially in the case of taxes. Many feel that the tax burden which industry will be called upon to bear in paying for past government spending is likely to be extremely heavy.

Kellogg Paid President

The inauguration of Charles W. Kellogg as the first paid president of the E.E.I. charts a new course for the industry. While there is likely to be no particular change in the direction which the E.E.I. has been operating in the past, it is felt that Mr. Kellogg will be in a position to take a more active part in the regional affairs of the Institute and the utility industry. Some activities of the Institute will be expanded, notably in the formation of certain committees working out problems of the industry.

Two new committees are likely to be organized in the near future—one to deal with rural work and expansion of service and another on customer relations and training of utility personnel. The companies are paying greater attention to employee training and customer relations and the E.E.I. feels that it should give all aid possible.

The E.E.I. will continue to cooperate with national groups and government bodies in working out problems of the utilities. Such co-operation will continue to be available to the National Association of Railroad and Utilities Commissioners on depreciation and other policies.

The Institute's aid will also be available to the group at work on uniform rate structures. Conferences with the different bureaus in Washington, such as the Bureau of Standards working on the National Electrical Safety Code, will continue.

Major Howard S. Bennion, vice-president and managing director, who was elected to succeed Bernard F. Weadock, who retired to resume the private practice of law, has been assistant managing director since the E.E.I. was organized.

Major Howard S. Bennion (left), who succeeds Bernard F. Weadock as vice-president and managing director of the Edison Electric Institute

Military Service Honors

Major Bennion was born in Vernon, Utah, in 1889, and was graduated from the United States Military Academy at West Point in 1912. He was graduated from the Army Engineers School at Washington in 1915. During the World War he was chief of the camouflage service and after the armistice served as executive officer for the chief engineer, A.E.F. For his war service he received the Distinguished Service Medal, the Legion of Honor of France and the Cross of Valor of Poland.

From 1920 to 1924 Major Bennion was assistant chief engineer of the Federal Power Commission, and from 1924 to 1926 he was district engineer in charge of flood control work on the lower Mississippi River at New Orleans. He was a member of the Missis-

J. T. Barron, Public Service Electric & Gas, and Kenneth McIntyre, Daniel Starch Associates; Bryan C. Hanks, Florida Power & Light, and Ashton B. Collins

sippi River Spillway Board. He became director of engineering of the National Electric Light Association in 1926 and assistant managing director in 1932.

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Sammis Named Head of Kitchen Bureau

Walter H. Sammis, vice-president of Commonwealth & Southern, has been elected chairman of the Modern Kitchen Bureau for 1940. He will assume his new office at once, succeeding George E. Whitwell, vice-president of Philadelphia Electric, who has been chairman of the bureau since it was established in 1935.

Mr. Sammis has had wide promotional experience covering many areas of the country and has always been particularly interested in the bureau's activities.

The bureau has become an outstanding example of successful co-operative sales effort in the electrical field under the direction of Mr. Whitwell. Starting with a single program and two field men four years ago, the bureau this year conducts five specific sales promotions and operates with six field men and a headquarters staff. Its promotion of electric ranges, roasters, refrigerators and water heaters has stimulated sales. The "all-electric kitchen" inaugurated the wide movement for planned kitchens.

A. L. Scaife, General Electric, has been elected chairman of the bureau's planning committee for 1940, succeeding L. A. Clarke, Frigidaire Corp. Mr. Scaife has served as vice-chairman of the committee this year. J. Nelson Stuart, Nash-Kelvinator, has been named vice-chairman of the committee for 1940.

Walter H. Sammis (center), vice-president of Commonwealth & Southern Corp., new chairman of the Modern Kitchen Bureau; Charles E. Swartzbaugh (left), Swartzbaugh Manufacturing Co., and C. E. Greenwood, commercial manager of E.E.I.

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Plan 3 Generating Plants in Carolina

The Lyles Ford Tri-County Power Authority, Union, S. C., has filed with the Federal Power Commission an application for license for a project consisting of three water-power developments on Broad River, Tiger River, Enoree River, Fair Forest Creek and Padgett Creek, S. C., with total generating capacity of 72,000 hp. and 247 miles of transmission lines.

Proposed developments are to be located in Newberry, Fairfield, Chester, Union, Laurens, Kershaw, Lancaster, York, and Cherokee counties, S. C., affecting lands of the United States in the Sumter National Forest.

Transmission facilities as proposed will consist of an inter-connected system of 110,000-volt transmission lines connecting the three power plants and interconnecting with the Buzzards Roost system of project No. 1,267 at Newberry, S. C.

Luncheon meeting of the Edison Electric Institute annual convention, which was held in New York last week

Anticipation Bonds Restricted by Court

Alabama Supreme Court has ruled that Alabama municipalities can issue no revenue anticipation bonds for construction of public electricity distribution facilities without approval of the state finance director.

In an appeal brought by the Alabama Power Co. the court overruled Jackson Circuit Court and granted a temporary injunction against issuance of such bonds by the city of Scottsboro.

In a companion case, the court reversed the DeKalb Circuit Court which held the city of Fort Payne could issue revenue anticipation bonds without consent of the state finance department, when such issue was approved by the electorate.

The Scottsboro decision, written by Justice A. B. Foster, emphasized the injunction did not restrain construction of the municipal power facilities, but stopped issuance of the bonds. Judge Foster said the cities, if they had money available from other sources, would not be hindered from going ahead with construction under the decision.

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Ordered to Report All Service Charges to FPC

To complete the investigation begun more than three years ago, the Metropolitan Edison Co., Northern Pennsylvania Power Co., Pennsylvania Electric Co., Erie Lighting Co., Clarion River Power Co. and Solar Electric Co., which by the order of the Federal Power Commission of January 6, 1936, were required to file statements of all charges for 1934 and 1935 representing payments made to companies or persons who had servicing contracts or working arrangements with the respondents, have been ordered by the commission to supply like information for the years 1936, 1937 and 1938.

The respondents are companies in the Associated Gas & Electric System operating principally in Pennsylvania.

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Files Answer to FPC Show Cause Rate Order

Sioux City Gas & Electric Co. in its answer to the Federal Power Commission's order to show cause by June 5 why the rates and charges for electric energy furnished to the South Dakota Public Service Co. as provided in its rate schedule F.P.C. No. 1 should not be made available to the incorporated city of South Sioux City, Neb., avers that by filing a lower rate schedule and explaining the differences in cost of servicing the two customers it has satisfied the commission's show cause order.

The Sioux City company in its answer states that such difference in rates as exists does not constitute an undue preference or advantage to South Dakota Public Service Co., or subject South Sioux City to any undue prejudice or disadvantage. The Sioux City company has filed with the commission a new rate applicable to South Sioux which will result in a saving to that city of 21 per cent.

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Strike Closes Plant of Allis-Chalmers

Chairman Otto H. Falk and President Max B. Babb of Allis-Chalmers Manufacturing Co., in commenting on recent events in the strike of the CIO-affiliated United Automobile Workers of America, said that "the company fully recognizes the right of the majority in each plant to bargain collectively through representatives of their own choosing. However, the company has never agreed to a closed or union shop and will not do so." The strike was called on May 27.

Company officials pointed out in the statement that the 1938 contract with the union was canceled by the union's bargaining committee after a cancellation and work holiday was declared. The company offered to renew the contract, but the union rejected the offer, and then, among other things, demanded a union or closed shop, check-off system and a joint contract to cover the operations of the West Allis, Pittsburg and Boston plants.

This contract, officials declared, gave the union a free hand peacefully to convert employees to its cause and membership. The company said that in refusing the union demands it believes that each employee should have the exclusive right to spend as he personally sees fit the money he earns.

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Frank Williams Resigns From Westinghouse

The resignation of Frank B. Williams, Jr., vice-president in charge of the merchandising division of the Westinghouse Electric & Manufacturing Co., is effective July 1, after which date he will return to his former home in the East to carry out personal plans. Before taking charge of the Westinghouse merchandising division Mr. Williams had been vice-president of the Diehl Manufacturing Co., Elizabethport, N. J.

Nebraska Power Sale Is Denied by Aller

American Power & Light Co. will not be forced to dispose of its controlling interest in the Nebraska Power Co. of Omaha under the terms of the utility holding company act, according to Howard L. Aller, president.

The statement of Mr. Aller was in reply to a resolution recently passed by the Central Nebraska Public Power District board stating that the Nebraska company, the state's largest private utility, must be disposed of under the act and urged that it be acquired "either by the city of Omaha or by a public power district, of which Omaha will form a part."

The statement also took notice of a letter sent by George E. Johnson, manager of the Central Nebraska District, to Mayor Dan Butler of Omaha, in which Mr. Johnson said that the district felt the company "should be purchased by people in Nebraska."

Mr. Aller said that the statement of Mr. Johnson that the reports of American Power & Light filed with the SEC show that Nebraska Power is not to be retained by American Power & Light is untrue.

"Furthermore, the American Power & Light has no intention or desire to dispose of its interest in Nebraska Power to any one," Mr. Aller said. It was pointed out that there have been no negotiations any time with any one in which American Power & Light has agreed to sell or indicated that it would be willing to sell its interest in Nebraska Power under any circumstances. Mr. Aller said that his company has taken the position consistently that it would be useless to negotiate for any sale of its present interest in Nebraska Power except on a plan which would be indorsed by the citizens of Omaha and other communities served by Nebraska Power.

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Sells Transit Facilities

Northern States Power Co., Eau Claire, Wis., on June 1 disposed of its Eau Claire City Bus Transportation System to the newly organized Eau Claire Transportation Co. The property includes fifteen buses. The sale leaves Northern States Power Co. without any transportation system operation of any kind in Eau Claire.

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Issue Speedily Subscribed

The entire issue of $18,000,000 first mortgage series A bonds of the West Texas Utilities Co. offered on June 6 was subscribed within an hour.

Baltimore Utility Makes City Industrial Survey

Leaders of business hail comprehensive work of Consolidated Gas, Electric Light & Power Co. — Wagner presents survey to Mayor Jackson — Aldred made first one in 1914

A comprehensive industrial survey of Baltimore showing the factual reasons for the remarkable expansion of business during the past quarter century in the area was presented by Herbert A. Wagner, president of the Consolidated Gas, Electric Light & Power Co. of Baltimore, to Mayor Howard W. Jackson last week at a dinner given by Mr. Wagner to leaders of the city's commercial and manufacturing enterprises.

It was the second such survey to form the basis for future expansion of industry in the Baltimore area, the first having been made in 1914 at the instigation of J. E. Aldred, then president of the Baltimore utility, and was the first thorough industrial survey to be made of any major city in the United States.

Started Work in 1938

Since the latter part of 1938 a research staff of the Baltimore utility has been at work on the survey acting under the guidance of an advisory committee consisting of William J. Casey, chairman; Mr. Aldred, Howard Bruce, E. Asbury Davis, James E. Hooper, Charles P. McCormick and Frederick W. Wood.

Mr. Aldred declared that when he undertook to make the first survey in 1914 he found that no such survey had ever been made. He said that "it was hoped that the survey might bring forth prospects for profitable enterprises in the creation of new forms of activity for, after all, the prospect for profit is the mainspring of economic activity and around this has centered the great industrial progress in this country. The release of individual energy under such a stimulus is the secret of the success of the great American system and the key to progress. Take away personal incentive and the contribution of individuals to the community at large is substantially lowered."

Mr. Aldred said that during the past twenty-five years the Baltimore utility has "pursued a broad policy of contributing to the activities of the community not only a satisfactory public service but also co-operated in all constructive enterprises."

Discussing the survey, Mr. Casey said that the expansion of business in the Baltimore area is in contrast to the country as a whole and other Eastern seaboard cities in particular. He said it provides useful information for Baltimore and manufacturers in other cities concerning Baltimore's physical facilities and economic position. "Its objectives are far wider than a mere assurance concerning conditions as they exist at the moment."

Reveals Growth

The survey reveals that between 1914 and 1937 there was an increase in the value of manufactured products of 211 per cent, manufacturers' wages of 216 per cent, number of wage earners employed by manufacturers of 31 per cent, wholesale trade of 130 per cent, retail trade of 163 per cent and population of Baltimore's industrial area of 43 per cent. Port activity shows the total of water-borne commerce up 162 per cent, total cargo tonnage up 113 per cent and number of overseas steamship lines up 233 per cent.

During this remarkable growth in the city, the survey reveals that local industries, during the past twenty-five years, have enjoyed as one of their principal assets an abundant supply of low-priced electric energy. In 1914 the combined resources of the hydro and steam plants constituted a "power pool" of approximately 170,000 hp. Additions to capacity, and the additional supply of hydro power from the Safe Harbor Water Power Corp., have increased the "pool" to a present figure of 744,500 hp., more than four times what it was twenty-five years ago. Construction now in progress at one of the steam plants will further increase the "pool" by 33,500 hp.

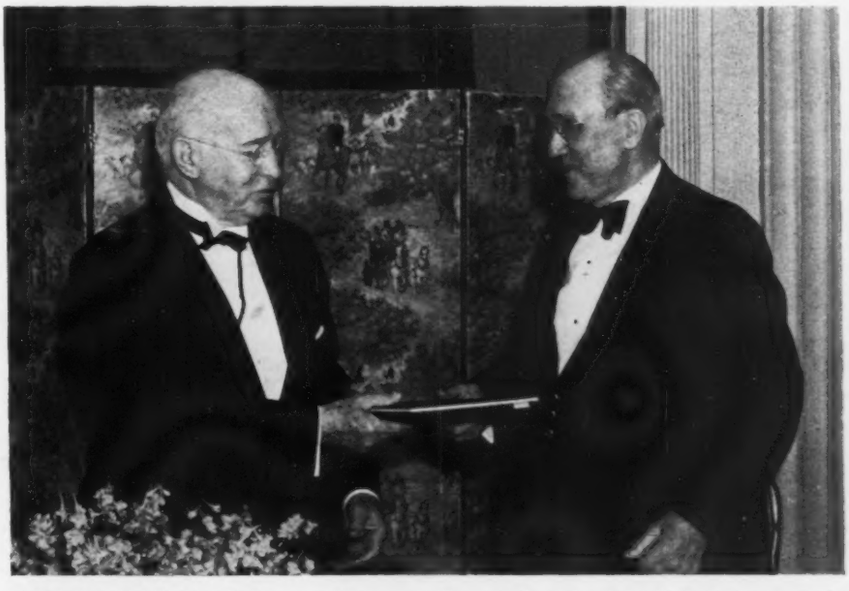
The survey reveals that Baltimore has a continuity of electric supply through four different sources and supplemented by interconnections. It showed that rates for industrial power have been maintained on a low level, a fact which has contributed directly to the location of a number of industries. Utilization of electric power by Baltimore's expanding industry is measured by the fact that industrial and commercial electric sales by the local utility have increased more than 600 per cent since the 1914 survey was made, it was stated.

Pledges Administration

Mayor Jackson pledged his administration to "aid in whatever proper plans may be made to get the full benefit of the survey for the people of Baltimore."

Senator Tydings said that "it is after listening to such surveys as this and being here with you business leaders who are ready to carry on that I get renewed hope that this country is bound to go ahead."

Great praise was given to the utility and the committee for the survey, considered an outstanding piece of work and a contribution of great importance. It was declared that such work indicated the great interest the utility has in the progress and well-being of the community.



PRESENTS SURVEY—Herbert A. Wagner (left) president of Consolidated Gas, Electric Light & Power Co. of Baltimore, presented the Second Industrial Survey of the city to Mayor Howard W. Jackson at a dinner last week

Program Announced for A.S.M.E. Meet

Greater service to science, industry and humanity has been chosen as the keynote of the national semi-annual meeting of the American Society of Mechanical Engineers, to be held in San Francisco, July 10–15. The Golden Gate International Exposition has designated July 13 as Engineers' Day, the main feature of which will be an address by Herbert Hoover, honorary member of the A.S.M.E.

Fourteen technical sessions will feature 28 papers by outstanding engineers in their field, including Dr. Adolphe Meyer, director of the steam-turbine department of Brown, Boveri & Co., Baden, Switzerland, who will describe the latest developments in internal-combustion turbines.

Dr. Rodolphe E. Ballester, engineer and director of the irrigation department of Argentina, South America, has accepted the invitation of A. G. Christie, A.S.M.E. president, to present the 1939 Calvin W. Rice lecture during the meeting. Engineers of the United States are acquainted with Dr. Ballester through his work as vice-chairman of the Argentine committee of the World Power Conference from 1930 to 1937, and as the delegate of the Argentine government to the Third World Power Conference and Second Congress of Large Dams in Washington, D. C., in 1936.

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"Help Your Neighbor" Contest in Kansas City

Kansas City Power & Light Co., in co-operation with 30 electric range dealers and distributors, is sponsoring an educational contest designed to promote interest in and provide a source of information on the advantages of electric cookery.

In operation the contest will bring the user and non-user of electric ranges together and opinions based upon the user's experience, rather than laboratory findings or theories, will be available to all who want practical information on costs, results, operation, etc. This contest is named "Reddy Kilowatt's Help Your Neighbor Contest."

There will be 800 cash and merchandise prizes distributed over a twenty-day period that will carry a total valuation of $8,400.

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Twin States Hearing Set

Federal Power Commission has ordered that a hearing be held June 22 on the application of Twin State Gas & Electric Co. to sell certain of its electric facilities in the state of New York to the New York Power & Light Corp. The Twin State company, which is a Connecticut corporation domesticated in the states of Vermont, New Hampshire and New York, filed an application with the commission for authorization to sell to New York Power & Light for $586,000 cash all its electric facilities in the state of New York except certain transmission facilities which are to be dismantled.

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Buys Electric Properties

Arkansas Utilities Commission has permitted the Arkansas-Missouri Power Corp. to purchase the electric properties of the Caraway (Ark.) Light & Ice Co. for $12,500.

MEETINGS

International Commission on Illumination—Scheveningen, Holland, June 12-21. U. S. National Committee, A. A. Brainerd, executive secretary, c/o Philadelphia Electric Co., Philadelphia, Pa.

Public Utilities Advertising Association—Annual convention, Belmont Plaza and Waldorf-Astoria Hotels, New York, N. Y., June 18-22.

Advertising Federation of America—Annual convention and exposition, Waldorf-Astoria Hotel, New York, N. Y., June 18-22. Henry Obermeyer, chairman program committee, c/o Consolidated Edison Co., New York.

Society for the Promotion of Engineering Education—Annual meeting, June 19-23, State College, Pa.

Canadian Electrical Association—Annual meeting, Digby, Nova Scotia, June 21-24. B. C. Fairchild, secretary, 804 Tramways Bldg., Montreal, Que.

Economics Conference for Engineers — Annual meeting, Stevens Engineering Camp, Johnsonburg, N. J., June 24-July 3.

American Society for Testing Materials—Annual meeting and fifth exhibit of apparatus and instruments. Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-30. R. E. Hess, assistant secretary, 260 South Broad St., Philadelphia, Pa.

American Institute of Electrical Engineers—Combined summer and Pacific Coast convention, San Francisco, Calif., June 26-30. H. H. Henline, national secretary, 33 West 39th St., New York, N. Y.

Michigan Gas & Electric Association — Annual meetings, Mackinac Island, Mich., June 29-July 1.

International High-Tension Conference—Bi-annual meeting, Paris, France, June 29-July 8. F. Attwood, president American National Committee, Ohio Brass Co., New York, N. Y.

American Society of Heating and Ventilating Engineers—Semi-annual meeting, Mackinac Island, Mich., July 4-6. Society Headquarters, 51 Madison Avenue, New York, N. Y.

American Society of Mechanical Engineers—Semi-annual meeting, San Francisco, Calif. July 10-15. C. E. Davies, national secretary, 29 West 39th St., New York, N. Y.

International Association of Electrical Inspectors—Joint annual meeting, northwestern and southwestern sections, Hotel Empire, San Francisco, Calif., August 14-18.

Illuminating Engineering Society—Annual meeting, Fairmont Hotel, San Francisco, Calif., August 21-25, Howard M. Sharp, general secretary, 51 Madison Avenue, New York, N. Y.

National Association of Railroad and Utilities Commissioners — Annual meeting, Seattle, Wash., August 22-25. Clyde S. Bailey, Secretary, New Post Office Bldg., 12th and Pennsylvania Avenue, Washington, D. C.

New Award Planned by Public Service

A medal and engraved certificate, to be called the "Thomas N. McCarter Electric Award," will be presented annually to the employee in the electric department, either operating or commercial, of the Public Service Corp. of New Jersey who has contributed the most toward the increase of efficiency and progress of the department.

The object of the prize is to encourage the qualities of initiative, perseverance, courage and foresight in the company's employees. This new award will supersede the $50 cash prize which was annually presented for the best suggestion, applicable to the electric business, made by an employee of the electric department during the calendar year.

Suggestions will be judged by a committee composed of the vice-president in charge of public relations, vice-president in charge of sales and the general auditor, electric.

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Name Parker Dam Lake

The board of geographic names of the Department of the Interior has approved "Havasu Lake" as the official designation of a body of water created by the construction of Parker Dam on the Colorado River, 155 miles below Boulder Dam. The word "Havasu" in the Mohave Indian language means "Blue."

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Niagara Petition Denied for Prolonged Hearing

Deciding that "it will not be in the public interest to grant any further delay in proceeding to the conclusion of the present proceeding," the Federal Power Commission has denied the petition of the Niagara Falls Power Co. for a continuance for at least 30 days of the hearing convened on June 1, in the determination of the actual legitimate original cost of the company's Niagara Falls project.

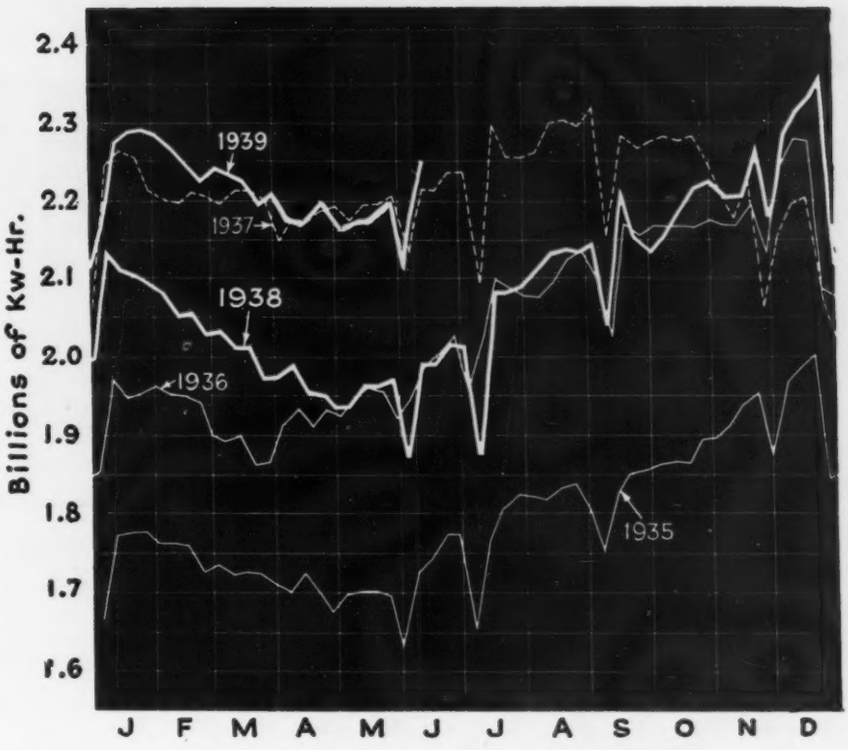
Randall J. LeBoeuf, counsel for the company, at the hearing contended that the cost determination should be made by the commission on the basis of "fair value" and not on that of actual legitimate original cost. This contention was overruled by Carroll B. Spencer, commission examiner, who decided that the hearing would be held on the same basis as that used by the commission in other determinations involving the actual legitimate original cost of the project.

Output Rises to New June Record

Turning sharply upward after the dip due to Memorial Day, the output of the electric light and power industry in the United States during the week ended June 10 rose to 2,256,823,000 kw.-hr., the highest ever recorded for a week in June, according to the Edison Electric Institute. The gain over the corresponding week a year ago, 13.3 per cent, was the largest thus far in 1939 and the excess over 1937, 1.9 per cent, was the largest since February, with two exceptions.

By the unusually large advance, about 52,000,000 kw.-hr., compared with the last week in May the output was restored to the level of mid-February, 93,000,000 kw.-hr., or 4.3 per cent above the season's lowest full week.

The outstanding regional gain over the preceding year was registered in the Central Industrial area, where it amounted to 17.5 per cent—the largest reported in that section since the spring of 1937. Elsewhere the percentage gains ranged from 8.1 in the Pacific to 13.6 in the Mountain states, with a tendency to widen in the great industrial regions.



Weekly Output, Millions Kw.-Hr.

1939		1938		1937	
June 10	2,257	June 11	1,992	June 12	2,214
June 3	2,114	June 4	1,879	June 5	2,131
May 27	2,205	May 28	1,973	May 29	2,207
May 20	2,170	May 21	1,968	May 22	2,199
May 13	2,171	May 14	1,968	May 15	2,195
May 6	2,164	May 7	1,939	May 8	2,176

Per Cent Change from Previous Year

Region	Week Ending June 10	June 3	May 27
New England	+11.8	+10.8	+13.2
Middle Atlantic	+12.7	+13.9	+10.6
Central Industrial	+17.5	+14.5	+14.2
West Central	+ 9.3	+ 7.3	+ 6.2
Southern States	+10.2	+10.5	+ 9.0
Rocky Mountain	+13.6	+14.4	+13.0
Pacific	+ 8.1	+ 9.1	+ 8.9
United States	+13.3	+12.5	+11.7

Shows Decreasing Trend of U. S. Part in World Output

Although electric power output in the United States last year was 3.8 per cent below 1937, world power output gained 4.3 per cent over the previous year, totaling 485,000,000,000 kw. in 1938, as against 465,000,000,000 in 1937, according to Winthrop W. Case, in a recent issue of *The Annalist*. With the United States excluded, Mr. Case continues, the output rose to 334,000,000,000 from 308,000,000,000, an increase of 8.4%.

Commenting on the decreasing share of the world output contributed by the United States, the article points out that in 1920 this country supplied 46.4 per cent of the total output, only 33.8 per cent in 1937 and, due to the recession here, only 31.1 per cent last year—almost one-third less than in 1920. The greater maturity of the electric power industry in the United States is credited for this trend.

•

Cities Fight Electric Tax

Representatives of fourteen city-owned power plants have named a committee to prepare a case testing the constitutionality of the Michigan law imposing the 3 per cent sales tax on sales of electricity by municipally owned plants. The committee includes Joseph W. Planck, Lansing city attorney; Rollin Shivel of Grand Rapids, representing the city of Lowell, and George R. Sidwell of Ann Arbor, representing the Michigan Municipal League. Mr. Planck said the case will be filed in the Ingham County Circuit Court in Lansing.

•

SEC Announces Changes in Holding Company Act

Two changes in the Holding Company Act rules have been announced by the SEC. Rule U-3 A3-1, which provides temporary exemptions for banks which hold 10 per cent or more of the outstanding voting stock of a public utility holding company or subsidiary, was changed to require semi-annual statements instead of quarterly statement. Certain matters heretofore reported may now be omitted.

The second change was in the form of a new rule, designated U-13-4, which provides for an application for exemption from Section 13 (b) of the act in regard to the servicing of foreign associates.

FPC Denies Associated Unit Extension of Time

Federal Power Commission has denied the petition of the Lexington Water Power Co., an Associated Gas & Electric Co. affiliate to grant an extension of time in which to file its response to the commission's show-cause order of May 2, which was returnable June 3.

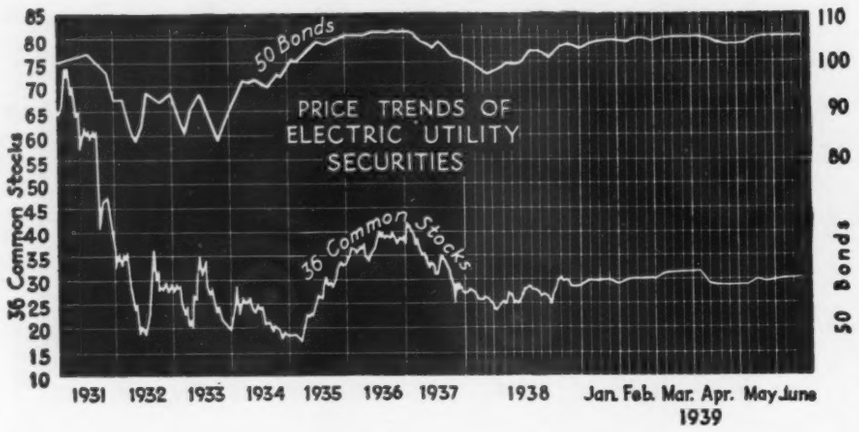
In that order the commission directed the company to show cause on or before June 3 why it should not comply in certain respects with the commission's order of October 19, 1937, and Opinion No. 28, and the provisions of the Uniform System of Accounts prescribed for public utilities and licensees and make proper adjustments in its books of account for Project No. 516, located on the Saluda River in South Carolina.

•

Canadian Output Lower

Output of central electric stations in Canada in April totaled 2,197,171,000 kw.-hr., compared with 2,366,532,000 kw.-hr. in March and 2,063,801,000 kw.-hr. in April, 1938. Exports to the United States in April were 141,523,000 kw.-hr., compared with 165,422,000 in March and 135,616,000 in April a year ago.

Utility Stocks Move Upward in Week


PRICE TRENDS OF ELECTRIC UTILITY SECURITIES
50 Bonds
35 Common Stocks
35 Common Stocks
50 Bonds
85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10
110 100 90 80
1931 1932 1933 1934 1935 1936 1937 1938 Jan. Feb. Mar. Apr. May June 1939

Electric utility stocks gained during the week, with the "Electrical World" index up 0.4 point to 31.0—highest mark for the second quarter; index a year ago, 24.8. Bonds remained steady during the week, with the "Electrical World" index staying at 105.6

Stockholders Vote Integration Plan

Shareholders of the New England Power Co. at a special meeting held this week approved a plan designed to integrate the property, simplify its corporate structure and effect certain economies in operation.

Matters approved by stockholders were:

Purchase of Bellows Falls Hydro-Electric Corp. for $12,381,729, subject to certain adjustments; purchase from the Connecticut River Power Co. of the Bellows Falls-Pratt Junction transmission line for $672,747, subject to certain adjustments; issuance of $9,650,000 of additional first mortgage bonds at an interest rate of not more than 3½ per cent; increase in the common stock by not exceeding 112,724 shares of $25 par value, to be issued at $30 a share. In connection with these transactions it is expected that on October 1 the Bellows Falls Hydro-Electric Corp. will redeem $9,000,000 of its 5 per cent gold bonds.

•

Grant American Gas Plea on Integration Hearing

SEC has granted the request of the American Gas & Electric Co. that the hearing on its integration plan be set for a date not earlier than September 15. The precise date has not yet been determined.

Last year the company filed an application pursuant to Section 11 (e) of the Public Utility Holding Company Act of 1935, wherein it requested an order of the commission approving a plan of integration and a finding that its holding company system in all respects complies with the provisions of Section 11 of that act. Since that date representatives of the company have been conferring with members of the commission's staff. In view of the necessity of the compilation and submission of information by the company and preparation by it for the hearing, the company requested that the hearing be deferred until mid-September.

•

Baltimore Utility Makes $7,000,000 Offering

Consolidated Gas, Electric Light & Power Co. of Baltimore has made an offering of $7,000,000 thirty-year 3 per cent first refunding bonds, series P, at 105 and accrued interest. The bonds will mature on June 1, 1969.

Net proceeds will be applied in part to the payment at or before maturity on July 1, next, of $3,400,000 of consolidated first mortgage 5 per cent bonds of the Consolidated Gas Co. of Baltimore City, the balance being applied toward the company's capital expenditures and for other corporate purposes.

•

Increases Dividend

Directors of the Southwestern Light & Power Co. have declared a dividend of $1.50 on the $6 preferred stock. A dividend of $1.12½ on this issue, which is in arrears, was paid on April 1.

•

Columbia Hearing Deferred

Announcement has been made by the SEC that the public hearing on the application of Columbia Gas & Electric Corp. under Section 11 (e) of the Holding Company Act has been postponed at the request of the company from June 14 to June 21.

•

Utilities Register Large Bond Issues

Washington Water Power Co., Spokane, has filed with the SEC a declaration in connection with the issuance and sale of $22,000,000 of first mortgage 3½ per cent bonds, series due 1964. Proceeds are to be used for the payment of the company's first refunding mortgage bonds due July 1, 1939, and for the redemption of the company's first and general mortgage gold bonds 5 per cent, series due 1960. The balance of the proceeds is to be used to reimburse the company's treasury in part for expenditures previously made for improvements to its facilities and for the financing of the company's business. Hearing will be held June 26.

Gulf States Utilities Co., Beaumont, Tex., has filed a registration statement, covering $27,300,000 of first mortgage and refunding bonds, series D, 3½ per cent, due May 1, 1969. Proceeds from the sale of the bonds together with the proceeds of a loan from Engineers Public Service Co., the parent company, will be used for the redemption of $27,300,000 principal amount of the company's outstanding first mortgage and refunding bonds, series C, 4 per cent, due October 1966.

New York State Electric & Gas Corp. has filed a statement, covering $13,000,000 of first mortgage bonds, due May 1, 1964, and 60,000 shares of 5½ per cent cumulative preferred stock, $100 par value. Of the preferred stock being registered, 29,276 shares are to be sold by the company and the remaining 30,724 shares are to be sold for the account of Associated Power Corp. and General Utility Investors Corp., affiliates.

Indiana & Michigan Electric Co. has filed for an exemption from the necessity of filing a declaration in connection with the issue and sale of $22,500,000 of 3¼ per cent first mortgage bonds, a $2,000,000 promissory note and not to exceed 150,716 shares common stock, no par value.

Utility Reports

	Net Income 1939	1938
*American G. & E. and subs.	$12,742,849	$12,488,815
*Consolidated Edison of N. Y.	35,240,984	34,091,662
*Engineers Pub. Serv. and subs.	4,670,989	3,754,416
*Florida Pwr. & Lt.	1,631,680	1,575,074
†Louisville G. & E (Del.) and subs.	1,223,199	1,573,786
*Louisville G. & E. (Ky.) and subs.	2,625,217	2,904,277
*Pennsylvania Pwr. & Lt.	7,874,471	7,922,454
*Puget Sound Pwr. & Lt. and subs.	1,781,659	1,588,809
*Utah Pwr. & Lt. and subs.	1,503,330	1,536,629
*Virginia Elec. & Pwr.	3,672,677	3,327,319
*Western Pub. Serv. and subs.	179,898	192,249
*Wisconsin Pub. Serv. and sub.	1,518,886	1,254,782

*Twelve months ended April 30.
†Twelve months ended March 31.

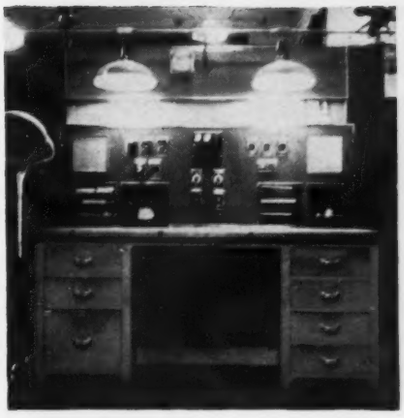
OPERATING PRACTICES

Service Desk Completely Equipped

By CHARLES WELCH
Wisconsin Public Service Corporation,
Wausau, Wis.

Customer service—lights out, repair of small appliances and the many other aspects of the service job—in utility divisional offices in small communities may often be the responsibility of one man on watch. He receives calls from customers, dispatches work to the men calling in from the field and in his spare time tests out-of-order and repaired flatirons, toasters, cords and whatever may be brought in for his skillful ministrations. For efficient performance of such a diversified job it is best to have all necessary facilities at one point.

Such arrangement clearly appears in the customer service desk in use in the Wausau service department of the Wisconsin Public Service Corporation. The desk is an ordinary flat top with a vertical back panel as shown in the accompanying illustration. Pigeonholes and recesses are provided in the panel for the telephone instrument and for the record and order forms used in receiving and dispatching trouble calls. These



Customer service dispatching, appliance tests and small repairs at one desk

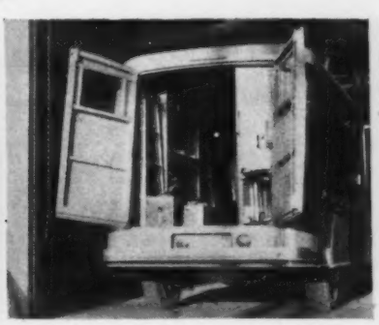
places are provided so as to leave the surface of the desk clear for testing. Behind the ground glass that appears at the upper left of the panel is a 500-watt lamp useful in tests where a significant amount of current is required as, for instance, burning open a short circuit. Next are receptacles and other connections for testing 220-volt commercial appliances, time clocks, range timers, small motors, etc. At the top right is a four-circuit fuse block through which energy is supplied to the board. In the drawers of the desk are kept the necessary tools and test leads.

Truck Is Field Shop for Meter Test Crew

By WILLIAM E. FRAZER
Transportation Department,
San Diego Consolidated Gas & Electric Company,
San Diego, Calif.

When it became desirable for the San Diego Consolidated Gas & Electric Company to expand its meter-testing program it was found necessary to develop something special in a transportation unit to carry on the work. All regular complaint and power testing has always been accomplished by one- or two-man crews operating coupe automobiles in which the minimum of tools, testing equipment and repair materials could be carried. The new supplemental schedule called for a larger crew and a transportation unit capable of becoming, in effect, a traveling workshop and headquarters.

The International six-cylinder "Stordor" delivery, with the unit Metro panel-type body, was selected as a suitable truck for this work. It is comparatively light, with an unladen weight of 4,800 lb., and is extremely flexible in traffic, having a 113-in. wheelbase. Interior width is 5 ft. 7½ in. and the inside height of the van at center is 5 ft. 1½ in. Load length behind the seats is 9 ft. 6 in.,



(Left)—International delivery truck, from which crew members work independently. (Center)—Bins for test instruments, repair parts, etc., are steel-built. (Right)—Step ladders fit conveniently into a space below the bins

which provides ample space for the requirements. Completely loaded with materials, tools and crew, the truck weighs 5,970 lb.

Inside the van section, on the left side just back of the driver's seat, is a steel storage bin section 2 ft. 9 in. long by 11 in. deep by 4 ft. 9 in. high, divided into six major bins and compartments of various sizes, some of which are still further divided into smaller compartments for small repair parts, in which are carried test meters and instruments such as rotating standards, phantom loads, meter registers and some repair parts. Flanking this section at the front and back is a hook secured to the panel uprights on each of which are hung two 2-ft. stepladders.

On the right side of the van section is a steel bin 5 ft. 6 in. long, broken into a number of compartments in which are carried new meters on bases, repair parts, small tools, etc. This section is raised off the floor by steel legs 1 ft. 7 in. to permit the storage of two 12-ft. extension ladders on edge. Just in front of the right-hand bin section is located the three-man cushioned seat with back for the crew. The driver's seat is the cushioned bucket type set upon a single post. Visibility for the driver is excellent. The interior of the van is accessible at the front from both sides through large sliding doors and at the rear through two vertically hinged doors.

The engine, which is located at front center, inside the driver's compartment, is protected by a large sheet-steel cover, which serves as a table on which is mounted a city map for use in plotting work districts for the day.

In operation, a definite schedule of meter testing is set, and the crew is routed from electric meter department headquarters each day to a district to be worked. The truck is driven to a point about the center of a district, where it is parked for the day. Each crew member works alone from the truck, carrying the short ladder and his tool kit. The crew can cover an area with a radius of about five blocks daily from the truck headquarters. Where old installations, high off the ground, are encountered, crew members with the short ladders leave the meter testing to the clean-up man, who carries one of the long ladders. These ladders are stored under the bin section.

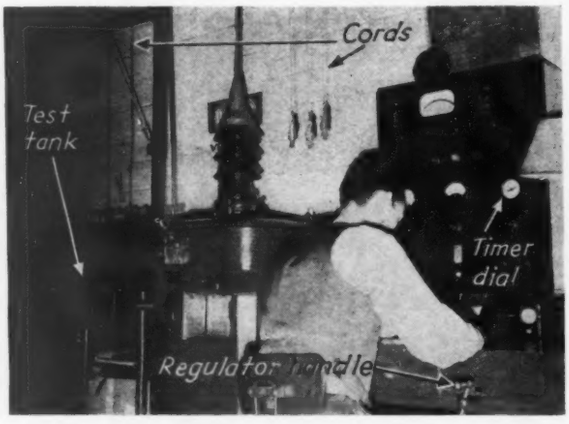
Glove Testing Made Effortless

Much of the drudgery of glove testing has been eliminated in the apparatus used at the Central Illinois Light Company, Peoria. An automatic timer does away with clock watching, leaving the operator free to take readings and make notes while the gloves are being subjected to 10,000 volts for the prescribed three minutes. Adjustment of the voltage regulator is done from the operator's seat at the test panel, from which position the operator can also raise and lower electrodes from the high-voltage bus in and out of individual gloves in the test tank without moving. The accompanying illustration shows the complete glove test apparatus.

The test timer is connected to the meter department's meter clock and receives an impulse from it once every minute. The third impulse after the timer is set on "start" actuates a relay energizing a small transformer that supplies a signal buzzer with 6 volts. This buzzer remains energized for a full minute unless shut off by the operator. On signal he lowers the voltage to zero with the regulator and removes the electrodes from all gloves but one without leaving the test table. This is done by means of the cord and pulley arrangement at the operator's left in the illustration. The voltage is then raised to 10,000 volts and the current leakage measured with the milliammeter. The voltage is again reduced to zero and procedure repeated for the remaining gloves in the tank.

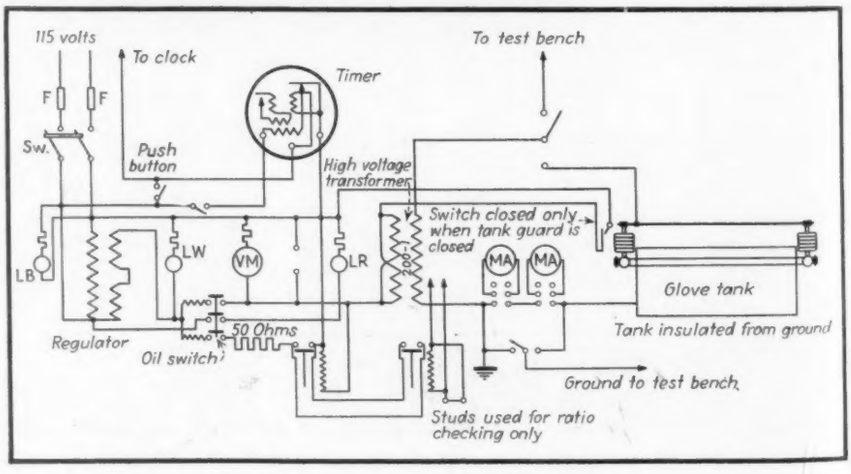
Setting of the 2.2-kva., single-phase induction regulator, connected for 0–230-volt output, 115-volt input, can be changed by the operator from the desk. In the illustration the regulator handle is seen under the operator's right elbow.

Output of the regulator is supplied to the 5-kva., 115/23,000-volt test transformer through a 550-volt, 25-amp. 3-pole oil switch with two series trip coils. The coil carrying load of the transformer (see diagram) has 64 turns and trips the breaker at 10 amp. The second coil is connected to the overvoltage trip circuit, using one set of breaker contacts as an "a" switch. A 37-ohm resistor in series



Perform all glove test operations from one position

From left to right, glass tank, test transformer, inclosed test tank, test transformer cords for raising and lowering electrodes in gloves, control and meter board. On control board, top row, voltage relays; below are indicator lamps, two milliammeters (different ranges) and timer dial. Note regulator handle under operator's elbow.



Timer in glove test circuit frees operator for taking readings

with the coil allows 3 amp. to flow in the trip circuit with normal voltage applied. A glass guard incloses the test tank and is provided with a switch that opens the test transformer circuit when the guard is raised. The test transformer can be connected to a high-voltage bench for tests on rubber blankets.

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Improved Method of Cleaning Conduits

An ingenious method of cleaning underground conduit and at the same time pulling through a temporary wire to be used later in the process of installing cable in the conduit is being used by the underground and transmission construction department of the Public Service Electric & Gas Company.

A rubber, bullet-like plunger, consisting of a series of rubber disks with a temporary wire attached to one end, is forced by compressed air through the conduit from manhole to manhole, to clean the conduit of dirt or other obstructions and provide a fish-wire. The end of this wire is then attached to the pulling rope, which, in turn, is connected through a swivel to cable being installed. If it is not planned to install the cable immediately, a bell cord, instead of wire, is fastened to the end of the plunger. The bell cord is reeled back each time after use until it is worn out. The reels of bell cord and wire are operated from a portable machine carriage stationed above ground.

Equipment for hand-rodding of ducts

New method of pneumatically rodding ducts.
The air compressor used is not shown in the illustration.

This method of cleaning conduits has been found more efficient than the system used several years ago. At that time wooden rods, each 3 ft. long, were coupled together, end to end, and pushed through the conduit.

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Does Boring Job in Quarter Usual Time

By F. S. PARTRIDGE
Construction Superintendent
Oklahoma Gas & Electric Company,
Oklahoma City

Faced with the task of boring four holes in each of 206 poles of a 66-kv. wood-pole transmission line during rebuilding operations, Oklahoma Gas & Electric Company assembled portable power-boring equipment that did the job in about one-quarter the time required with hand tools, as was told on page 74, May 6, ELECTRICAL WORLD. Here are additional details on the operation.

A gasoline-engine-driven d.c. generating unit supplied the power drill and was carried from location to location along the 11½-in. line on a small truck of the "pick-up" type. The unit consisted of a 2-hp. farm-type gasoline engine and a 1½ kw., 110-volt d.c. generator. It had previously been constructed for furnishing lighting on emergency construction and maintenance jobs.

The electric drill is ⅝-in. size, 110-volt universal type for either a.c. or d.c. current. The bit used in this particular case was a $\frac{13}{16}$-in. size ship auger.

Ordinarily in boring holes in timber work the screw point is removed or filed smooth when used in a power drill. However, we obtained bettter results without disturbing the screw point at the end of the bit, owing to the fact that the creosote oil in the poles provided sufficient lubrication to keep it clean.

The only improvement that we can see at this time over the method we used in doing this work is if an electric drill of a shorter over-all length should be obtainable. The length of an ordinary electric drill of this size, together with the length wood bit necessary to drill through a 60-ft. Class 2 pole, is rather cumbersome for a lineman to handle unless he is a tall man.

Weatherproof Wire and Cable*

Kansas City Power & Light Specifications

1—Conductors

The conductors shall be of copper and shall conform with the specifications of the American Society for Testing Materials as to conductivity, weight, strength, test, etc., in accordance with the following numbers:

Annealed (soft drawn), A.S.T.M. Specification B3-15
Medium hard drawn, A.S.T.M. Specification B2-15
Hard drawn, A.S.T.M. Specification B1-15
Stranded conductors, A.S.T.M. Specification B8-21

Tests shall be run and properties shall conform to these specifications after the weatherproofing process. Exception—in so far as strength requirements are concerned, an additional tolerance of 5 per cent will be allowed.

The area of cross-section of conductor in the completed wire or cable as delivered shall not be more than 2 per cent below the area specified. The surface of the conductor shall be clean, smooth, free from splinters and free of any condition that will hinder soldering.

Strands—These conductors shall be made up with concentric strand, the number of wires to be as given in the following table.

Number of Wires in Each Size

Size of Conductor	Number of Wires
2,000 m.c.m.	91
1,500 m.c.m.	61
1,000 m.c.m.	61
600 m.c.m.	37
500 m.c.m.	37
400 m.c.m.	19
0000 A.W.G.	19
00 A.W.G. and smaller	7

For intermediate sizes, use stranding of next larger size.

Solid Conductors—Solid conductors are usually specified on the smaller sizes, but will not be asked for in sizes larger than No. 0000 A.W.G.

* The first of a series of five covering specifications to get single-conductor wire and cable that can be installed throughout the year and which will give reasonably long service.

INDUSTRIAL ENGINEERING

Electronic Controls Operate Trimmer

By substituting photo-electric and time-delay controls for a conventional foot-operated treadle, the Quickwork Company, Chicago, has developed a machine for trimming stampings which with simple round stampings can attain a production

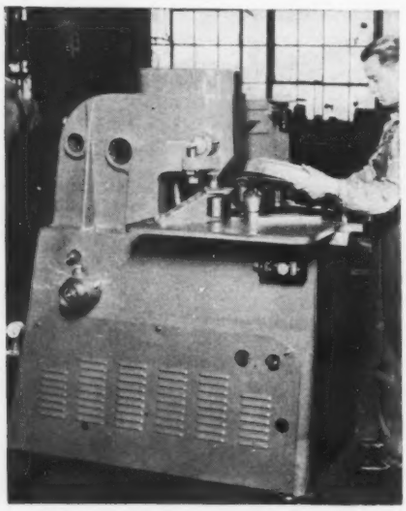


Photo-electric relay starts, electronic time-delay scheme stops trimming operation

of 120 pieces per hour. This is secured with more convenience to the operator on jobs where the same operation is repeated many times.

To operate the machine, with the stamping in position on the machine the operator simply passes his hand through a light beam focused on a phototube and the machine starts to trim the stamping. This trimming operation is timed by a vacuum-tube timer relay so that at the completion of the cut the machine opens automatically for unloading.

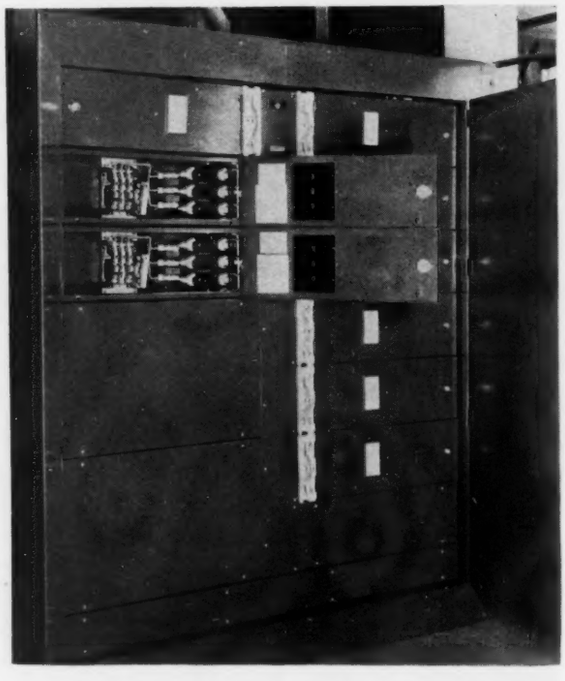
The adjustable time delay of the timer relay is obtained in the conventional manner by varying a resistance in series with a condenser so that a longer or shorter time is required for the condenser to build up to its full voltage. This condenser voltage is applied to the grid of a vacuum tube in circuit with a relay so that as the critical grid potential is reached the tube will operate, actuating the relay. Thus, in effect, the photo-electric control takes the place of the start button and the time-delay control replaces the stop button.

The new machine is in effect a rotary shear with its cutters mounted on vertical shafts. Parts to be trimmed lie horizontally on a pneumatically operated table. The necessary electric control equipment, except for the phototube and light source, is conveniently located out of sight in the base of the machine together with a vacuum tube time-delay relay and magnetic sequencing and motor - starting controls. To facilitate set-up operations, the phototube itself can be swung away from the table. General Electric phototube and vacuum-tube timer relay are used.

Compact 440-Volt Motor Control Panel

Larger motors in the recently built Southern kraft pulp and paper mills use the current at the generated voltage, whereas motors of, say, 50 hp. and smaller are fed from either a central or a group of step-down transformers. These 440-volt motors comprise a large number, averaging about 15 hp. each, and are located quite closely together in the various rooms or departments.

Suitable space for placing motor controls is generally available only in some distant corner of a building at the premium of wiring cost. Full-voltage starting of motors is possible at both voltages, with few, if any, exceptions. For 440-volt motors combination line starters, consisting of either fused safety switch or thermal breaker as line switch and magnetic



Compactness features 440-volt motor control panel installed in Southern paper mill

Entire control for shop, consisting of twenty circuits, is furnished in two panels mounted back to back within 18 in. width, 76 in. length and 82 in. height, with space for seven additional circuits when needed. Ammeter test jacks go with each motor control cabinet.

For the Minimum Investment

Compact, Segregated-phase Switchgear

—a Complete Installation in Itself

FH Cubicles

Safety

TO THE OPERATOR

He cannot open the doors unless the breaker and the group-operated disconnecting switches are open

THEY ARE COMPLETE—ALL NECESSARY ASSOCIATED EQUIPMENT INCLUDED

1. Modern Type FH oil-blast circuit breaker
2. High-speed, trip-free breaker-operating mechanism
3. Six group-operated disconnecting switches
4. Mechanical interlocks between breaker, switches, and doors, assure correct operation
5. Heavy-duty structural-shaped buses
6. Heavy-duty bus supports
7. All copper inter-connections have silver-to-silver current-exchange surfaces
8. Necessary current transformers

For Power-station Service up to 23,000 volts and 2,500,000 kva

ALL FACTORY-ASSEMBLED IN A STEEL HOUSING

GENERAL ELECTRIC

starter furnished in standard inclosures, are racked in groups at the available locations.

Following the trend of modern switchgear built in metal-clad or cubicle housings, shop-assembled and shipped in large units ready for putting on customer's foundation, a similar standard has been followed in one mill for the 440-volt control. As in the well-known door-in-door lighting panel design, power panels were assembled by the manufacturer, using a single-width sheet-steel cabinet for size 1 and 2 starters for motors up to 25 hp. and double-width for size 3 for 50-hp. motors, complete with bus and connections thereto, leaving ample space all around for leads to motors and push buttons, also incoming main feeder cable.

This type panel occupies only a small fraction of floor space required for the more conventional racked assemblies, permitting placement at the load centers without encroaching upon accessibility to process machinery. Where operating conditions dictated, close-fitting brick inclosures with access door and ventilation holes were provided to protect against splash, drip or dust.

Advantages for such construction include:

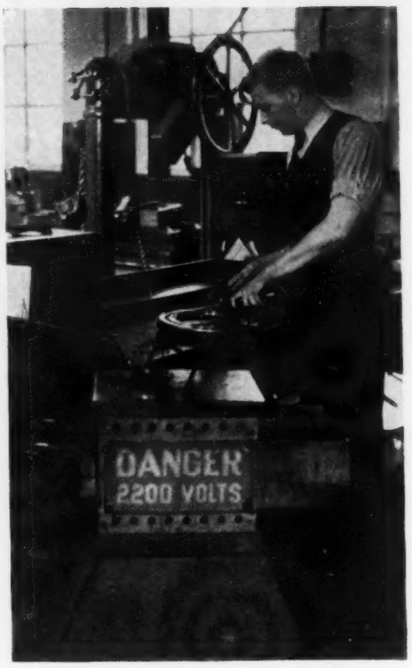
1. Shop construction promises qualitatively better wormanship.
2. Saving in wiring all around.
3. Minimum time required for erection—highly important during the last stages of mill erection.
4. Can be readily placed where most accessible to operator.
5. Facilitates quick power survey departmentally or for entire mill with less likelihood of overlooking one department.
6. Quickest access to operator in charge in time of emergency.

These features were obtained without sacrifice of any safety provisions generally embodied in the standard commercial motor control equipment, and last, but not least, at a substantial saving in cost of wiring and installation.

•

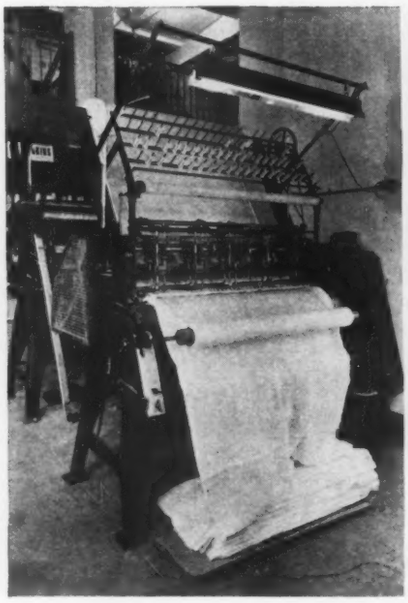
Portable Test Set Handled by One Man

The usefulness and convenient handling of a 2,200-volt testing transformer was increased recently by the Blanchard Machine Company, Cambridge, Mass., by equipping the 20x24-in. platform carrying the transformer with four casters in place of the previous use of handles requiring two men for transport around the shop. The unit plugs into any convenient 110-volt socket and furnishes 2,200 volts at the terminals for testing the insulation of coils designed for use with magnetic chucks, and checking up the electrical condition of bakelite parts of machine tool motors, collecting rings and other material. An air circuit breaker is connected in the 110-volt supply of the transformer and a pilot light on top of the unit shows when it is alive. Although the test set weighs 200 lb., one man can handle it anywhere in the establishment.



Casters replace handles on testing transformer for easier portability

Fluorescent Lighting Aids Quilting Machine Operation



Fluorescent lighting, providing 30 ft.-candles at the needles of these quilting machines, helps the operators detect a broken thread at once, an important operating advantage, since the operator may have to watch as many as 30 threads at one time. Above each of the 30 machines in the plant of the Independent Quilting Company, New York, N. Y. (right), is mounted an industrial-type reflector, housing a single 36-in., 30-watt "daylight" fluorescent Mazda lamp (left) and the necessary auxiliaries. Units are spring-supported at each end to absorb vibration pick-up from the machines, and plug into separate 220-volt a.c. outlets. The installation was made by the industrial division of the Maintenance Company, New York, N. Y.

"RED" IS HERE

To Help You Cut Your Maintenance Costs!!

G-E 1201 Glyptal Red will protect your motors, controls, and insulation from ARCING, MOISTURE, HEAT, OIL, ACID, ALKALI, DUST, and SALT AIR. Glyptal Red is an air-drying or quick-baking Glyptal. It's famous as a protective coating on coil windings, metallic surfaces, porcelain, molded insulation, etc.

HERE'S WHY IT CAN DO A FINE JOB FOR YOU:

1. *High heat resistance.*
2. *Non-carbonizing under arcing.*
3. *Prolonged resistance to mineral oils.*
4. *Resistant to kerosene and gasoline when baked.*
5. *Resistant to sodium carbonate and oleic acid.*
6. *Resistant to adherence of dirt due to its smooth, hard, glossy surface.*
7. *Comparatively high dielectric strength.*
8. *Tenacious adherence to underlying surface.*
9. *High degree of flexibility.*

GLYPTAL RED HAS HELPED TO CUT MAINTENANCE COSTS IN MANY PLANTS

Let it help you, too. Glyptal Red, like all other G-E Insulating Materials, has been developed to give lasting, economical protection to electrical equipment.

If you have not received a Glyptal Red folder from your G-E Distributor, send this coupon to us immediately. We'll send it to you in a hurry!

GENERAL ELECTRIC

Section M-9116, Appliance and Merchandise Department,
General Electric Company, Bridgeport, Connecticut.
Please send me the new Glyptal Red Folder right away.

Name.....

Company.....

Address.....

NEW ENGINEERING IDEAS

Pocket Torque Tester for Demand Registers

By WALTER C. WAGNER
and STANLEY B. CALHOON
Meter Division, Philadelphia Electric Company, Philadelphia, Pa.

Variations in the registration of kilowatt demand as indicated by watt-hour meters, producing either a low or excessive reading, are possible if the friction holding the pointer should change beyond the limits allowed for proper operation.

A pocket-type torque tester, developed by the authors, readily and accurately tests the pointer and clutch features of all types of demand registers without their removal from the meter.

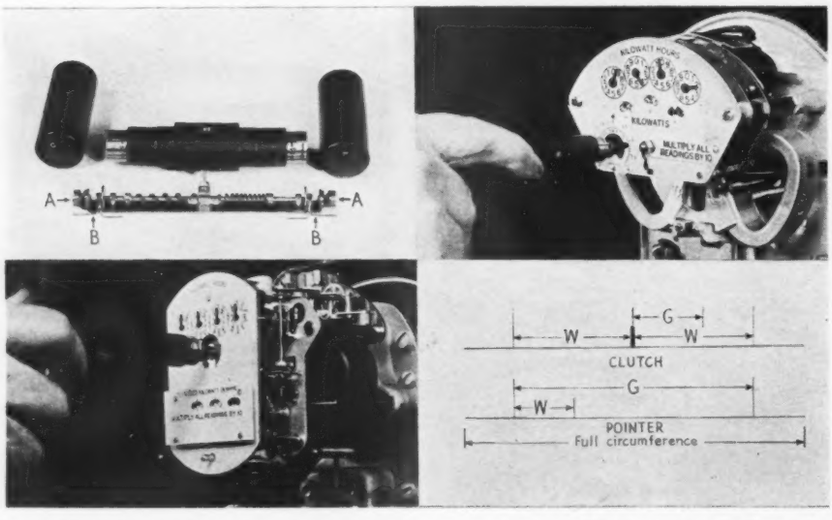
Used by meter testers during the past year in making periodic checks of demand registers, the device has afforded economies in operating costs by enabling the tester to make such tests in place, to adjust incorrect tensions and to prevent the needless changing of registers suspected of having a slipping clutch or pointer.

Details of the device are shown in accompanying illustrations. Two non-interchangeable caps protect the operating ends and are marked to distinguish the pointer friction measuring end ("P") from the clutch end ("C"). Mounting supports ("A-A") hold the tester in place on a register; these mounting heads are designed to fit two different makes of registers and adapters can be made to extend their application.

At ("B-B") are shown two wire fingers, one projecting forward to engage the test point, and the other projecting back over a calibrated scale, shown in plan view. The springs within the device may be adjusted to give the desired ranges of torque. A stop is provided to limit the rotation of the shaft carrying the springs, so as to maintain the calibration of the device.

As shown on the plan view of the periphery of the scale, the limits of acceptable tension are indicated by vertical limit lines. Thus these vertical end lines represent points of low or high tension. Tension value may be etched on the scale as shown by the letters "G" and "W," in which the letter represents the make of register. The horizontal lines from a letter to vertical lines represent the safe limit of tension.

The illustrations of the application of the instrument to two types of demand registers show how the projecting wire element of the tester is brought in contact with the register pointer or its equivalent. Through the rotation of the shell, grasped by the hand, the tension value of the part being tested is read from the position of the wire element on the calibrated scale.



Pocket-type torque tester permits demand register checks without removal from meter
Details of the testing device are shown in upper left and the periphery of the calibrated scale, in plan view, in lower right. Application to two types of demand registers is also shown.

•

New Guying Indicator Speeds Rural Staking

By ELLSWORTH J. JOHNSON
Washington, D. C.

A novel guying indicator, recently developed by the author for the sizes and types of conductors, span lengths and pole lengths ordinarily used on REA projects, eliminates the handling of bulky tabulations or the use of slow and laborious calculations.

There are nine main factors to be considered in guying the pole: Size and type of conductor; line angle (angle in degrees through which the line turns); span length; loading district (determined from the National Electrical Safety Code); length of pole; lead in feet (horizontal distance from butt or pole to guy); sizes of guy wire, anchor rod and anchor. Of these, all except the last

A New, Inexpensive Addition to the Popular Kearney Line—

the Hi-TENSION STEEL TWO WAY EXPANSION ANCHORS

"The Mark of Quality Products"

Now—build greater security and safety into your lines—inexpensively—with these new Kearney (Armco Steel) Expansion Anchors . . . Get maximum holding power, too, because these anchors, like the other 2-way expansion anchors of the popular Kearney line, are similarly designed with blades that expand up to 2½ times their rated size and have as much as 63% of the blade area in firm, undisturbed earth.

And they are easy to install: special contour of the blades exert an outward as well as upward force—they expand through their original arc—thus preventing wedging effect and assuring proper expansion with minimum effort.

Kearney Hi-Tension Steel Anchors incorporate the advantages of special design for installation ease and holding power; strong: made of Armco Steel; lighter weight and—inexpensive.

You really should try this anchor—make rigid tests and prove to yourself that all of the things you want in an inexpensive anchor are built into this one . . . Ask a Kearney Representative or—write today for new low prices and detailed information.

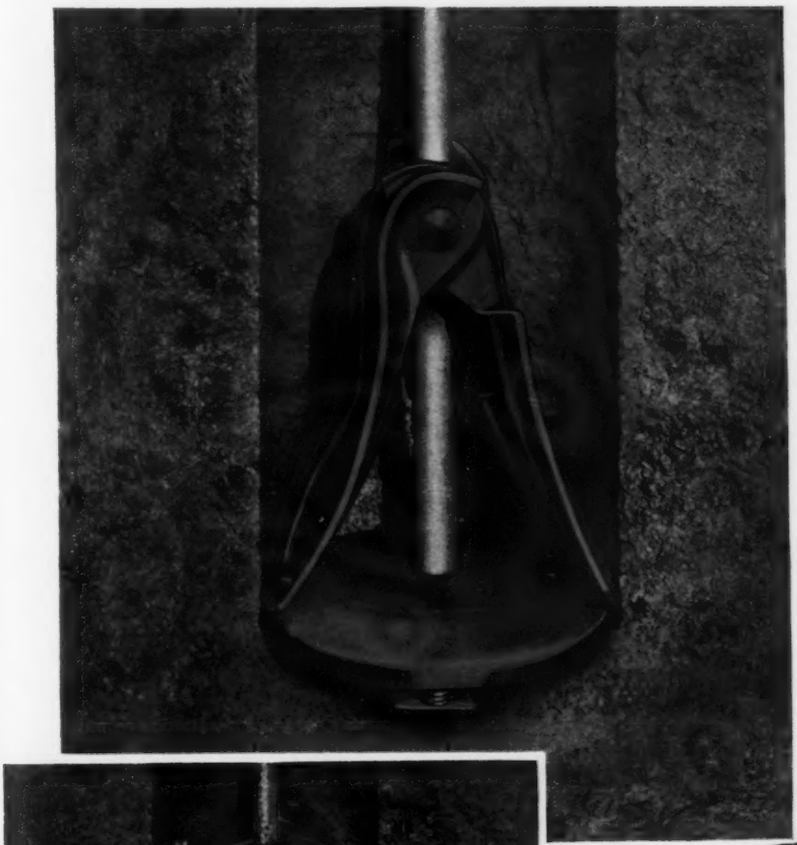
JAMES R. KEARNEY CORPORATION

Manufacturers of Overhead and Underground

UTILITY EQUIPMENT

4224-42 CLAYTON AVE. • ST. LOUIS, MO.

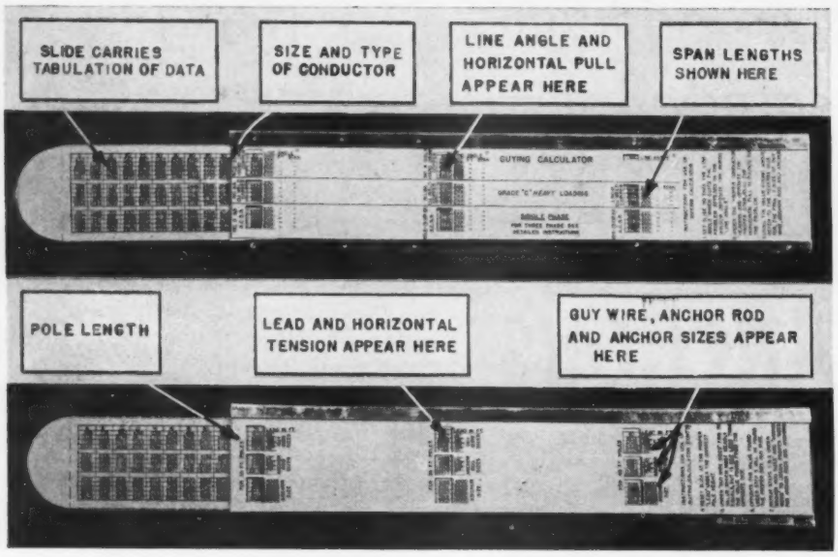
Canadian Plant, Toronto, Ontario, Canada.



Kearney Engineers, in cooperation with Field Engineers, have designed these steel anchors in four 8-inch sizes—with expanded blade areas of 90", 110", 125" and 136".

For Better Maintenance and Construction—

Use KEARNEY PRODUCTS


SLIDE CARRIES TABULATION OF DATA
SIZE AND TYPE OF CONDUCTOR
LINE ANGLE AND HORIZONTAL PULL APPEAR HERE
SPAN LENGTHS SHOWN HERE
POLE LENGTH
LEAD AND HORIZONTAL TENSION APPEAR HERE
GUY WIRE, ANCHOR ROD AND ANCHOR SIZES APPEAR HERE

Novel slide rule determines sizes of guy wire, anchor rod and anchor on rural lines

three, *i.e.*, the guy assembly, are known from the layout of the system; it is the purpose of this indicator properly to determine these values.

Two slide rules are used; one is designed for heavy loading districts and one for medium, the medium being considered adequate for use also in the light districts. While both rules are designed for single-phase construction, for three-phase, four-wire and two-phase, three-wire systems it is necessary only to double the values found on the face of the rule as outlined later and proceed as usual on the reverse side of the rule, using these doubled values. Or the operator may use two assemblies of the size that would be required for similar conditions on a single-phase basis.

The rule is used in this manner: Step 1—Three groups of windows on the face of the rule (upper illustration) are marked with size and type of conductor, line angle and span length. The slide is set so that the desired line angle appears at the top of the opening corresponding to the type of conductor chosen. Within the opening, opposite the known span length, may be read off the value of the horizontal pull tending to overturn the pole.

Step 2—On the reverse side of the rule (lower illustration) are three more groups of windows marked with pole length, lead in feet and guy wire, anchor rod and anchor sizes. Slide is readjusted so that the known lead appears at the top of the opening corresponding to the known pole length; within the opening are a group of values for horizontal tension. From these figures a value is picked which most nearly equals, but is not less than, the value found under step 1 above. Opposite this figure will be found the proper size of guy wire, anchor rod and anchor for the known set of conditions.

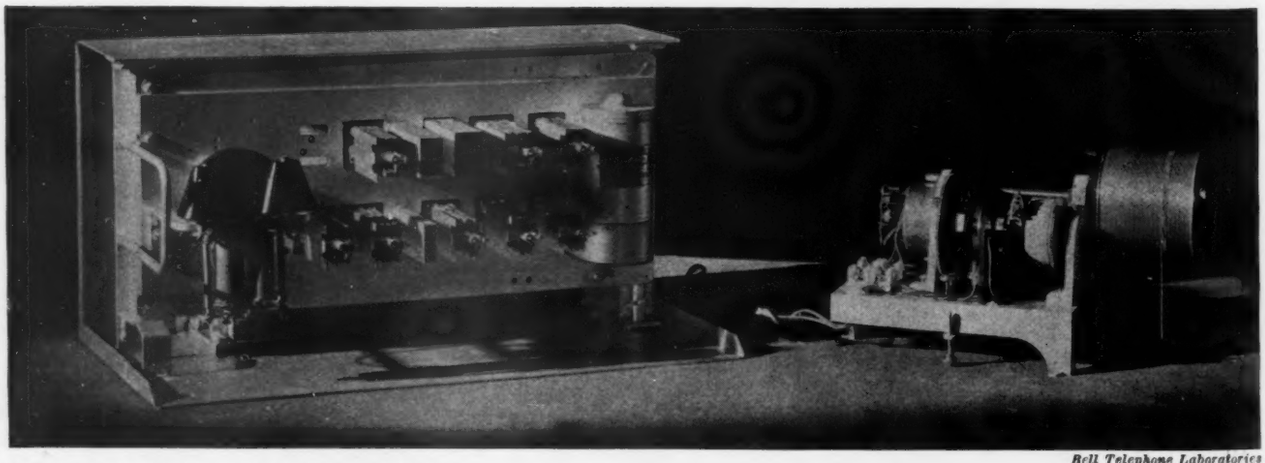
Telemetering Device for Hydro Plants

Equipment for telemetering the position of a moving element, such as the height of a river, includes a mechanical device that follows the rise and fall of the water and is connected to control apparatus which in turn is connected through a special telephone line to the nearest central office. All of this equipment is housed in a closed and locked station along the river bank.

To operate the equipment, the unlisted number of the river-bank station is dialed; the control apparatus returns a tone indicating that the called station is "answering." The river level device next transmits a "start" tone and then times off an interval whose length in seconds is proportional to the number of feet that the river is above a predetermined level. A "stop" tone indicates the end of this interval and, by timing it with a stop-watch, the calling party is able to figure the actual height of the river.

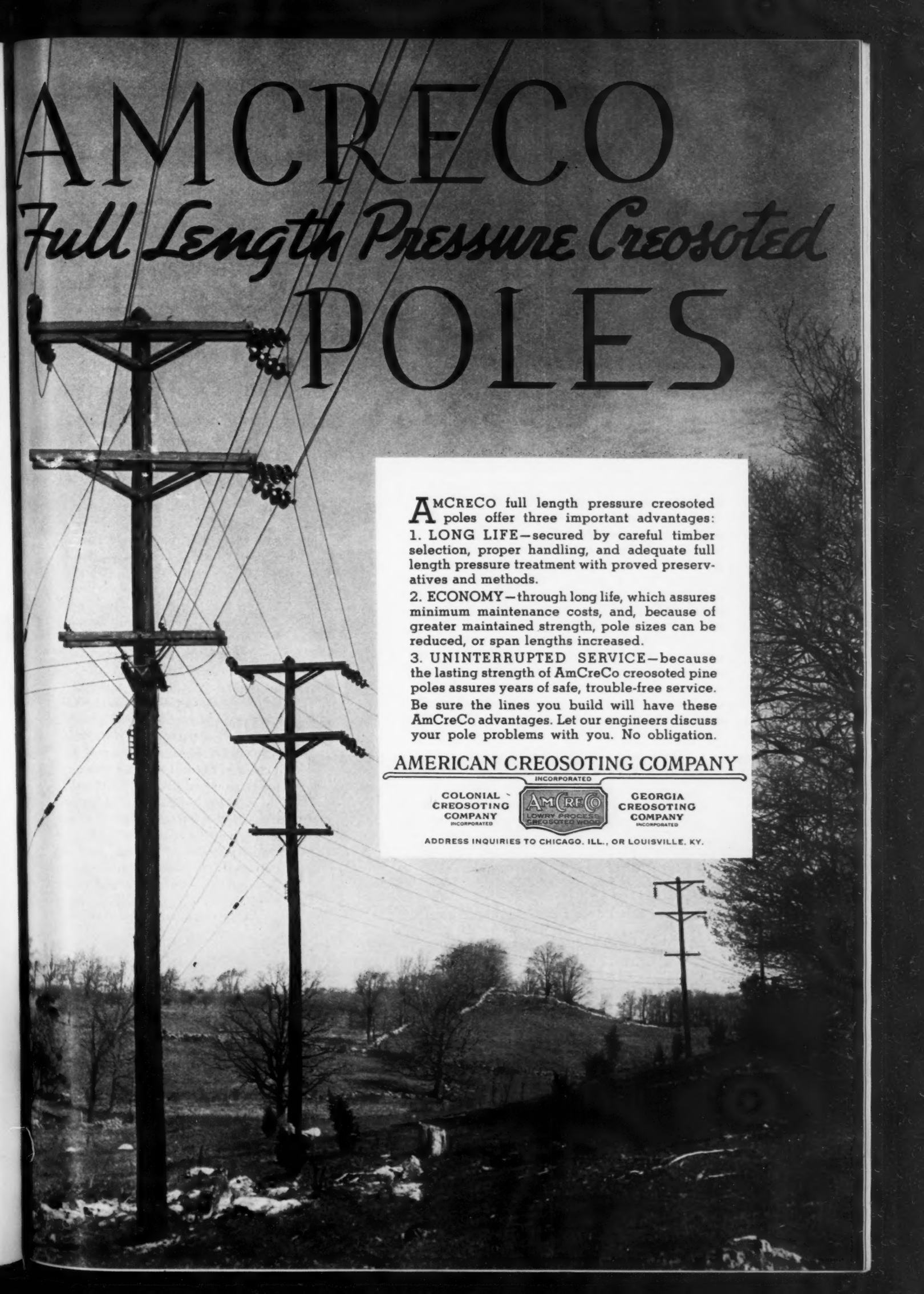
Control relays, ringer and transmitter comprise equipment

The control apparatus, which is inclosed in a cabinet, contains control relays, a ringer and a transmitter, while the cover of the cabinet has cutouts which admit the tones set up by the river level device. This apparatus was designed by Bell Telephone Laboratories as "unattended station equipment" and is incorporated in the Stevens "Telemark" of Leupold, Volpel & Company, of Portland, Ore., and also with the river level indicator developed by Carl H. Au & Son of Washington, D. C. (illustrated).



Bell Telephone Laboratories

Signals river height over telephone circuit



AMCRECO full length pressure creosoted poles offer three important advantages:

1. LONG LIFE—secured by careful timber selection, proper handling, and adequate full length pressure treatment with proved preservatives and methods.

2. ECONOMY—through long life, which assures minimum maintenance costs, and, because of greater maintained strength, pole sizes can be reduced, or span lengths increased.

3. UNINTERRUPTED SERVICE—because the lasting strength of AmCreCo creosoted pine poles assures years of safe, trouble-free service.

Be sure the lines you build will have these AmCreCo advantages. Let our engineers discuss your pole problems with you. No obligation.

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY
INCORPORATED

AMCRECO
LOWRY PROCESS
CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY
INCORPORATED

ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

LOAD BUILDING

Fluorescent Display With 300 Ft.-Candles

By B. W. SAVELAND
Metropolitan Edison Company,
Reading, Pa.

Years ago Meyer Liefter of Reading had the foresight to know that higher show window intensities and novel lighting installation produced greater customer attraction to his merchandise and his store. He was one of the first to make a lens plate installion in his window which produced about 100 ft.-candles illumination on his merchandise.

Today Dr. Liefter has again proved his progressiveness and foresight with the completion of a show window installation producing more than 300 ft.-candles of illumination of daylight quality from 30 feet of fluorescent lamps in specially designed reflectors which make up the entire ceiling of the show window.

Specifically, the installation consists of a series of four parabolic-like trough reflectors 7 ft. 6 in. long fastened together and hung as a false ceiling 4 ft. above the display space, which is 2 ft. 8 in. x 8 ft. 2 in. Each reflector is lamped with two 36-in. T8 and one 18-in. T8 daylight fluorescent lamps. All wiring is brought out to a metal box containing the reactors for the lamps which is mounted above the false ceiling. The resulting illumination of 300 ft.-candles is uniform and shadows are soft. Because of the depth and contour of the reflectors there is no glare nor apparent brightness of the reflectors.

Four hundred and 32 inches of daylight fluorescent lamps produce 300 ft.-candles of daylight in this Reading, Pa., show window

Electric Cooking Builds Patronage

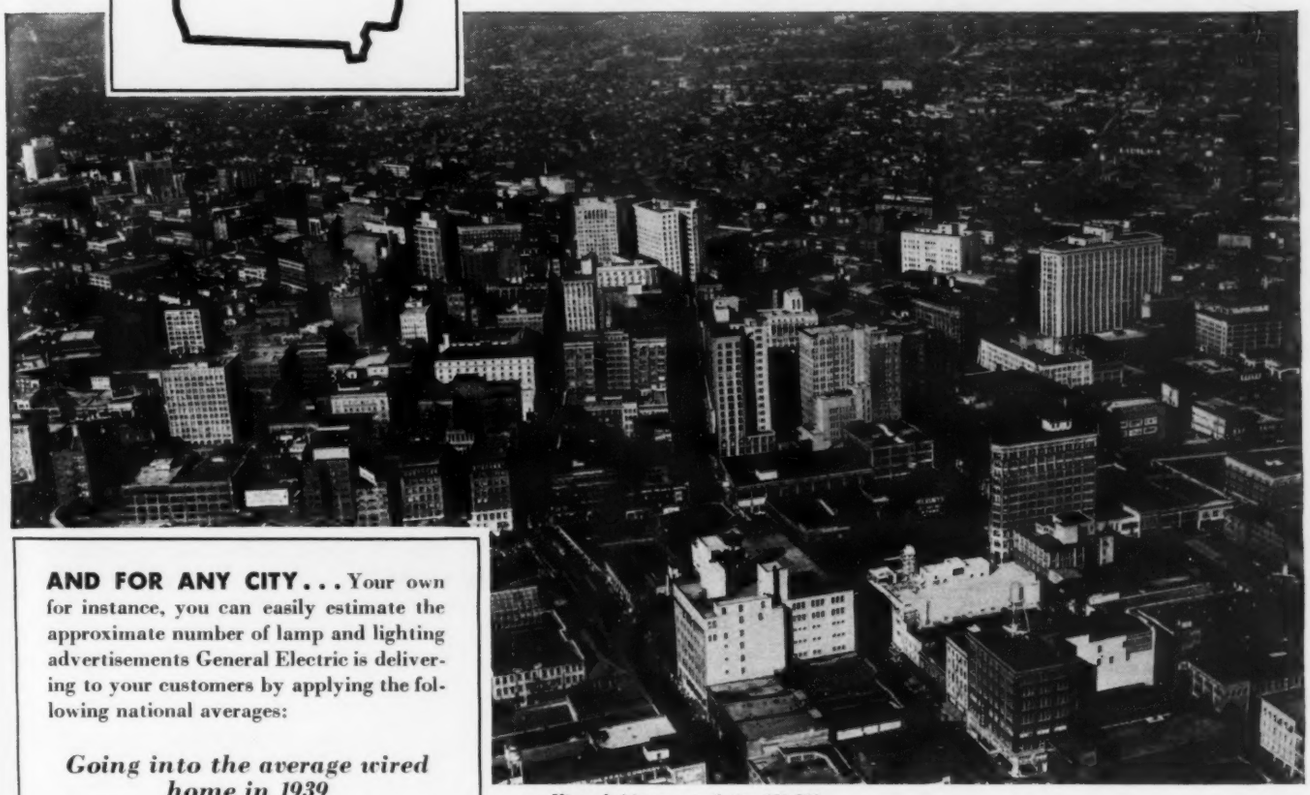
Electric cooking at the Hotel Kenmore, Boston, won acceptance by the management from several angles when the decision as to making a complete kitchen installation arose. The Boston Edison Company serves this hostelry and enjoys the benefit of a connected kitchen load of 127.6 kw., apart from lighting and air-conditioning energy consumption. The approach of the hotel manager, Lee Whitney, to the installation of an all-electric kitchen carries several points of interest from the electrical equipment user's side of the fence. Mr. Whitney stated, in the presence of an ELECTRICAL WORLD representative, that his interest in all-electric service originated in the Northwest lumber field. The installation of an all-electric sawmill by the Weyerhauser interests during the World War appealed to him as an advanced step, and the intensive use of electric cooking in the Northwest by housewives captured his imagination. Later, on a trip to Bermuda, he spent a day in the ship's galley, and concluded that if electric cooking was suitable for such service, it ought to be equally valuable in a hotel.

It was not enough to make the

Hotel Kenmore's Electric Cooking Equipment

No.	Kw. Rating	Unit	Total Kw.
1	23	Range	23
3	18	Ranges	54
1	6	Roasting oven	6
1	12	Broiler	12
2	7.2	Fry kettles	14.4
1	6	Food warmer table	6
1	1.5	Roll warmer	1.5
2	2.5	Toasters	5
1	1.65	Meat grill	1.65
1	4	Griddle	4
		Total	127.55

Selling lamps and lighting in ATLANTA, GEORGIA



View of Atlanta, population 280,000

AND FOR ANY CITY... Your own for instance, you can easily estimate the approximate number of lamp and lighting advertisements General Electric is delivering to your customers by applying the following national averages:

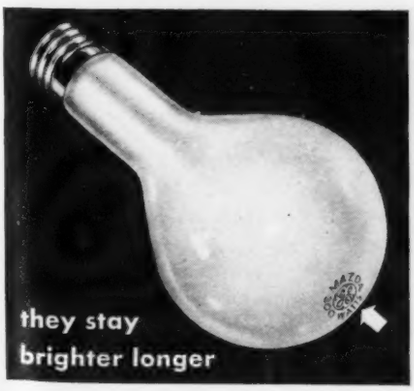
Going into the average wired home in 1939

14 magazines with G-E lamp ads
5 newspapers with G-E lamp ads
5 radio messages
24 total advertising messages

• • •

In the last 10 years, the average wired home received

158 magazines with G-E lamp ads
30 newspapers with G-E lamp ads
20 radio messages
208 total advertising messages



HERE'S a quick summary of the way that General Electric lamp advertising is constantly at work in Atlanta, promoting light-conditioning for Better Light-Better Sight. Into Atlanta homes every week goes a stream of G-E lamp and lighting advertisements amounting to 51 impressions per person in the last ten years.

IN 1939..... 801,000 magazines with G-E lamp advertisements and 368,400 radio messages.

SINCE 1929... 8,451,000 magazines with G-E lamp advertisements.

FALL 1938.... 1,152,000 copies of Atlanta newspapers with G-E lamp advertisements.

LAST 3 YEARS... 3,990,241 newspapers with G-E lamp advertisements.

SINCE 1929... 13,915,000 advertisements in magazines, newspapers, and radio . . . which is approximately 51 advertisements per capita.

G-E MAZDA LAMPS

GENERAL ELECTRIC

Battery of four electric ranges totaling 77 kw. serves Boston hotel

installation and obtain the well-known operating advantages of electric cooking, but the management entered into this type of service with the intention of capitalizing upon it in every feasible way, particularly in advertising and the promotion of patronage. Electric cooking is a good merchandising theme and has added a very handsome figure to the total gross income. Customer reaction has been exceptionally good and many patrons have proffered the information that they came to the hotel and its restaurant section to see if electrically cooked food tasted any different from food prepared by other means. Combined with the appeal of air conditioning the service has won widespread commendation. Banquet patronage has increased 35 per cent. In the words of the management, "operating a hotel restaurant without an electric kitchen is like driving a car without four-wheel brakes."

•

Farm and Home Coach Covers Georgia

As a part of the Georgia Power Company's policy of giving assistance to load-building activities on lines constructed by government agencies to serve farms of Georgia, a farm and home coach owned and operated by the company is carrying its messages to consumers of electric membership co-operatives.

The work of the coach is supplemented by five merchandise display coaches which also are touring the co-operative lines as requested by the managements of the various co-operatives. Coaches and operators sell nothing to the co-operative members. They simply show and tell new electric users what farm and home appliances can be used, as well as how to use them in order that electric service may render complete satisfaction.

During the past three years of operation the kitchen coaches have confined activity to towns of less than 1,000 population and have been visited by more than 19,000 rural Georgia men and women at 1,198 separate points.

•

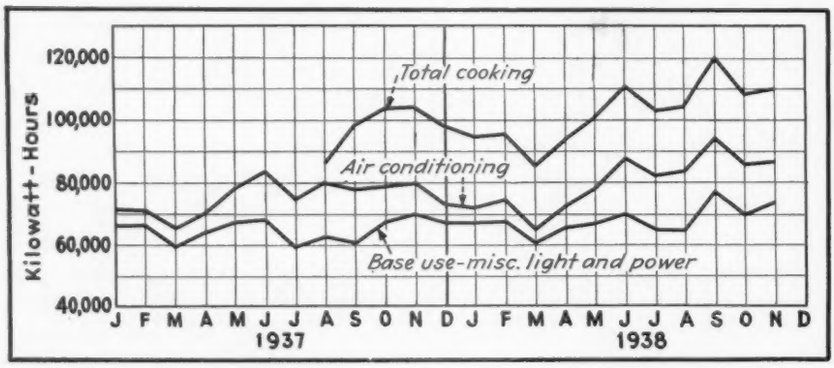
Rural Load Mortality Reduced by Handbook

The fact that a selling job is never ended is exemplified in a new publication by Southern California Edison Company, Ltd. Despite the fact that irrigation pumping already constitutes an exceptionally sizable portion of Edison's system load, the company is making sure it will remain so. "Water on the Farm" is a booklet which might well serve as a model for publications dedicated to the task of helping a particular type of customer.

Published by the company's Farm Electrification Advisory Department, it represents a small mine of information on water, presented in a form which any farmer can understand and comprising straightforward information of benefit to existing and prospective customers alike.

Printed on high-grade coated paper are 32 pages of data illustrated with first-class photographs. The editors vigilantly kept electricity's part in the farm-irrigation picture confined to sections where it legitimately belongs, and many of the subjects guide the farmer in phases of irrigation with which electricity has only an indirect connection.

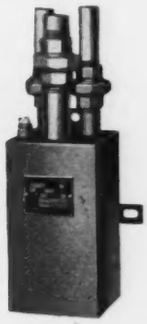
There is, for example, considerable detail on how to measure flow through weirs, how to make contour checks, how to keep pumps working efficiently, etc. A bibliography of irrigation publications is included.



Load characteristics of Hotel Kenmore and related apartment hotels Braemore and Wadsworth, totaling 900 rooms

Electric cooking load applies to Hotel Kenmore; air conditioning load to public and private dining rooms of Hotel Kenmore, and base load of miscellaneous light and power applies to all three establishments, which are operated by a common company. All are on Boston Edison service. Area under base use line represents light and power energy consumption for period covered; area between air conditioning and base use lines represents kilwatt-hours consumed in air conditioning, and area between air conditioning and total cooking lines represents energy consumption in cooking. Upward trend reflects increased patronage since electric kitchen was installed in August, 1937, attributed in part to attractiveness of electric cooking and to hotel publicity capitalizing the quality of this service in food preparation.

Type A — Conventional Distribution Transformer.



Type SS-1 Series — Series Street Light Transformer with primary & secondary detachable couplings.

Type HS — Pyranol Cooled Subway Transformer.

Type MC—Dry Type Transformer for indoor or outdoor service. Manufactured in sizes 1 to 10 KVA.

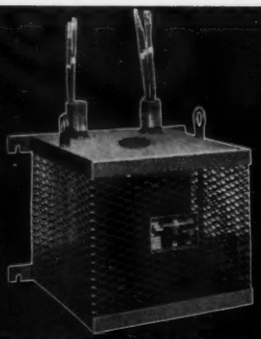
Standard

TRANSFORMERS

for Every Class of Service

For a complete description of the design and construction used in the manufacture of each type of transformer, refer to the bulletins listed below.

Type HV—Test Set for high potential testing.

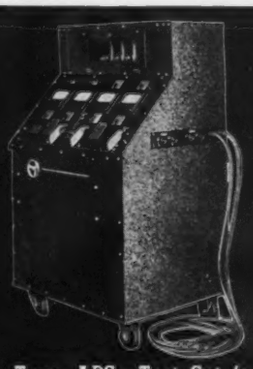


Type MD—Dry Type Transformer for indoor service. Manufactured in sizes 3 to 50 KVA.

THE STANDARD TRANSFORMER CO.

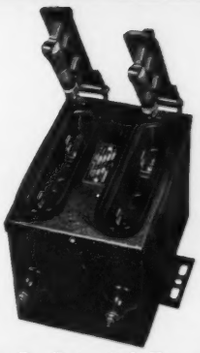
Manufacturers

WARREN, OHIO, U. S. A.

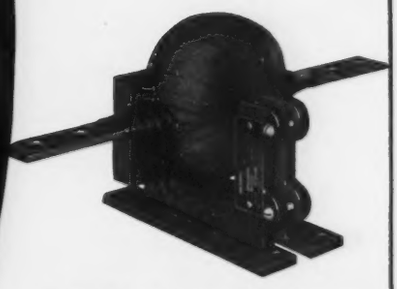


Type APS—Test Set for the complete testing of alternating current equipment.

Type A—2000 KVA Power Transformer.



Type P—Potential Transformer with primary submergible fuses —for indoor service.



Type NA—Current Transformer for extremely accurate metering service.

SIGNALLING TRANSFORMERS ..... No. S-100
PYRANOL COOLED TRANSFORMERS ..... No. S-101
DRY TYPE TRANSFORMERS No. S-201

RURAL TRANSFORMERS .. No. S-301
DISTRIBUTION AND POWER TRANSFORMERS ..... No. S-401

CURRENT AND POTENTIAL TRANSFORMERS ..... No. S-501
TESTING TRANSFORMERS No. S-601
STREET LIGHTING TRANSFORMERS ..... No. S-701

NEW EQUIPMENT

Transformer Cooling Fans

Portability of these cooling fans permits transportation to emergency centers and is said to allow a more flexible cooling arrangement than where fans are permanently mounted on transformers. Normally, they are spaced about the transformer

Transformer cooling fans; motor, 1 hp., 1,750 r.p.m., 2- or 3-phase, 60 cycles, for all standard voltages; capacity, 5,000 cu.ft. in free air; weight 145 lb. **Diehl Mfg. Co.**, Elizabethport, N. J.

and adjusted so that the fan wheel directs air upward over the transformer radiators. This produces a scrubbing action which removes heat film from the surfaces of the cooling fins. Use of fans is said to lower operating temperatures in case of emergency overloads and to provide increased normal capacity without exceeding safe operating temperatures. Fans may also be used for permanent cooling of other central station equipment.

•

Yard and Plant Light

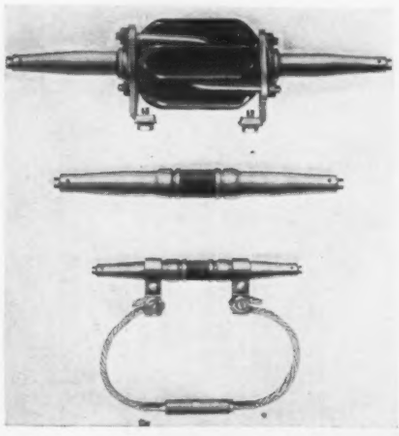
"No. U-818"; with medium socket to accommodate a 200-watt multiple lamp. **Holophane Co., Inc.**, New York, N. Y.

Wide lateral and narrow vertical spread of light is provided by this flush or exposed wall mounting unit for yard and plant lighting. A compound hemispherical "Refractolens" is used; prisms are within the sealed chamber and thus protected from dust, outside surfaces being smooth. Lighting compartments in generating stations, car loading and shipping platforms and watchman's gate station are typical applications. Even lighting on spacings as great as four times the mounting height is said to be provided.

•

Conductor Sectionalizers

Three new line sectionalizers equipped with automatic line splices provide a new, rapid, tool-less method of sectionalizing conductors of a banked secondary system. The devices also find many applications on series street-lighting systems. The "Johnny Ball"-type sectionalizer has its line splice members held to the insulator with U-clamps. Clips are provided for bridging the insulator with a fuse if desired. Another type with an insulator of synthetic material separates the line splice members. This insulating line splice type sectionalizer is modified by adding fusing-clips to form the third or clip-type sectionalizer.



"Johnny Ball" insulating line splice and clip-type conductor sectionalizers made in all sizes, No. 6 solid to 250,000 circ.mil conductors. **Electro'ine Co.**, Chicago, Ill.

•

Push-Button Stations

"Bulletin 800" push-button control stations; in horizontal and vertical arrangements; max. d.c. rating, 1 amp. 115 volts; 0.5 amp., 230 volts; 0.25 amp., 550 volts; max. a.c. rating, 3 amp., 110-220-440-550 volts. **Allen-Bradley Co.**, Milwaukee, Wis.

New line of standard-duty push-button control stations is offered by this company in single- and double-button types. Inclosure consists of Bakelite cover on die-cast frame; cover can be taken off by removing a single screw, providing access to the contact mechanism and terminals and simplifying wiring. Push-button mechanism is of the unit-type construction; double-break, silver contacts are located in recessed chambers for protection against dust and dirt.

•

Ventilating Fan

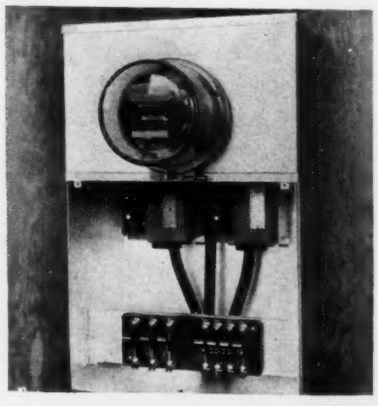
Attic fan; air delivery, 11,000 cu.ft. per minute; maximum velocity, 900 ft. per minute. **General Electric Co.**, appliance and merchandise department, Bridgeport, Conn.

A new development in attic ventilation uses a ceiling-type fan 52 inches in diameter. This six-blade up-draft fan draws air from the house upward into the attic through a large grille and discharges it out of doors through open windows or louvers.

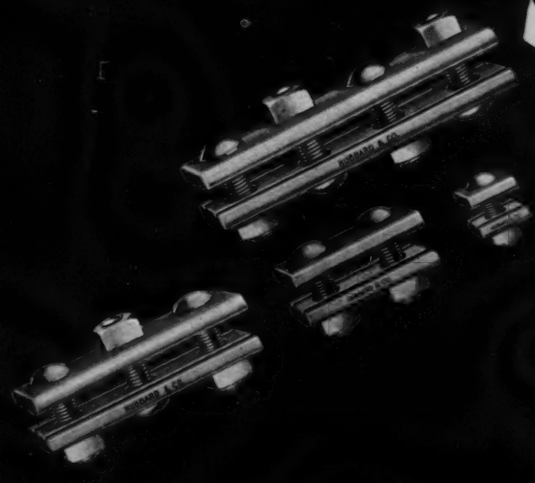
•

Metering Equipment

Combination units for socket-type meters and through-type current transformers are a recent announcement. Suitable for indoor or outdoor installation, the units include meter sockets and terminal blocks with circuit closing device. Transformers are mounted in simple clamping bar brackets to facilitate installation or removal. Meter terminal blocks are mounted clear of transformers on brackets which can be removed for running of cables. Removable shelf is provided in each cabinet for mounting test switch.



Instrument transformer metering equipment; for single-phase, four-terminal; two-element, eight-terminal; three-element, 13-terminal, Y-connected and three-element, 14-terminal, delta-connected meters; shown with lower door open for transformer inspection or meter testing. **Anchor Mfg. Co.**, Boston, Mass.



THE LONG—

AND SHORT—

. . . OF GUYING PROBLEMS

FROM A PUNY PULL ON A ONE BOLT "BABY" CLAMP, TO THE TOUGHEST TUG ON THE FOUR BOLT "DADDY"—ARE SOLVED BY HUBBARD STRAIGHT-GROOVE, SUPER-GRIP GUY CLAMPS

HUBBARD AND COMPANY

PITTSBURGH . . . OAKLAND CALIFORNIA . . . CHICAGO

"HANG THE LOAD ON HUBBARD HARDWARE"

#435R

"NOCORONA"
Quiet Insulators

PINCO INSULATORS

SALES AGENTS
THE JOSLYN COMPANY
New York, Rochester, Philadelphia
JOSLYN MFG. & SUPPLY CO.
Chicago, Kansas City
JOBBERS SUPPLY CO.
St. Paul, Portland, Seattle
SOUTHEAST JOSLYN CO.
Cincinnati, Cleveland, Atlanta
J. J. COSTELLO
Boston
JOSLYN CO. OF CALIF.
Los Angeles, San Francisco
H. E. BURNS CO.
Pittsburgh
SOUTHERN JOSLYN CO
New Orleans
PAUL DOUDEN
Denver
JOSLYN SOUTHWEST CO.
Dallas

Because
Pinco "NOCORONA" Insulators

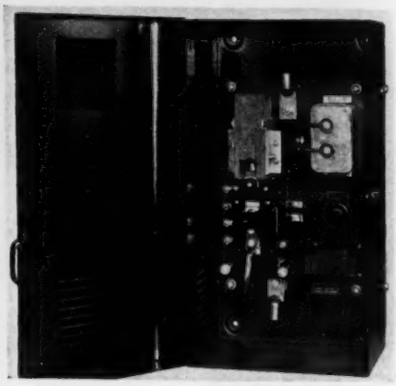
1. Have "fired in" radio proofing—physically and ceramically a part of the insulator.
2. Have smooth conductor surfaces, are free from "fringe effect" and remarkably resistant to arcover burns.
3. Have rugged construction, unaffected by "NOCORONA" treatment.
4. Have been manufactured for years by approved Pinco processes.
5. Have service records *proving* quietness at operating voltage.

SEND FOR SAMPLES

The Porcelain Insulator Corporation
LIMA, NEW YORK

Welder Control

Prolonged contact tip life and higher ratings are claimed advantages of this a.c. magnetic contactor, used in the control of resistance-type welding machines to apply and interrupt the power supplied to the primary of the welder transformer. A small

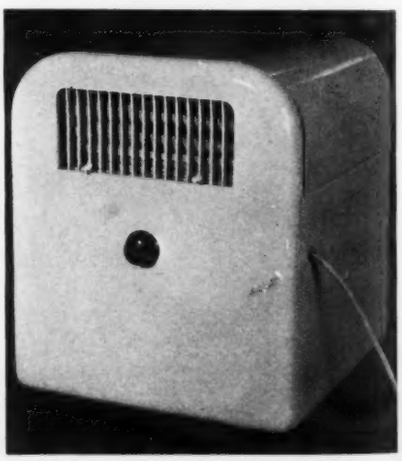


"Syncro-Break" synchronized magnetic contactors; single-pole; nominal contactor amp. ratings, 100, 150 and 300. **Square D Co.**, Industrial Controller Div., Milwaukee, Wis.

transformer for separately energizing the contactor shading coil has been added to eliminate the arc usually drawn between contact tips by providing means for selecting the point at which the circuit is broken without regard for the point at which the operating coil is de-energized. Rheostat in series with the transformer primary allows a 60-electrical degree shift in contactor opening to permit selection of minimum arcing point.

Air Conditioning Unit

Neither window connection nor water piping is required for a new portable air conditioning unit, which requires only plugging into an electric outlet and filling with three gallons of water to be put into operation. Unit is said to cool about



"Airola:" measures 13 x 14 x 15 in., weighs about 30 lb; models for a.c. and d.c., 110 volts. **Airola Corp.**, 46 Walker St., New York, N. Y.

120 cu.ft. of air per minute by evaporative cooling, the temperature of the air leaving the machine being about ten or more degrees below the entering air. Knob control regulates air volume and three sets of louvres or vanes permit variation in the direction of the air discharged from a blower-type fan. Air is

Twenty-year-old Exide-Chloride still in service at Northeast Station of Kansas City Power & Light Company.

Kansas City Power & Light Company's Northeast Station.

Still in Service After 20 Years

Naturally Kansas City Power & Light Company Installs Exide-Chloride at its Grand Avenue Plant

IT WAS in October, 1919, that the Kansas City Power & Light Company, Kansas City, Mo., installed at its Northeast Power Plant the Exide-Chloride Battery pictured above. It was assembled in 124 lead lined tanks—as was the practice at that time.

This station has an installed capacity of 154,000 k.w., 60 cycles, 13,800 volts. The motor generator sets are operated continuously, with the battery floating and connected to the station control buses. There are also connections from the battery to the emergency exciter buses and also to automatic throw-over switches to station emergency lights.

So gratifying have been the results obtained from this battery, which with no plate renewals, is still in excellent condition after twenty years of service, that the Company recently ordered a modern 120-cell Exide-Chloride for its 106,000 k.w. Grand Avenue Station.

The Kansas City Power & Light Company's satisfaction with Exide-Chlorides is duplicated in hundreds of other industrial and utility companies throughout the country. If you would learn why these batteries have given such universally satisfactory service, write for Bulletin 204; it describes the remarkable construction of these batteries in detail.

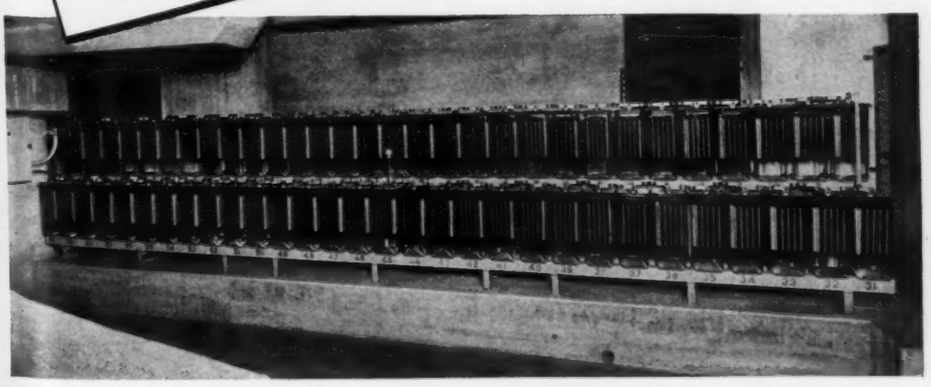
Exide CHLORIDE BATTERIES

THE ELECTRIC STORAGE BATTERY CO.

The World's Largest Manufacturers of Storage Batteries for Every Purpose

PHILADELPHIA

Exide Batteries of Canada, Limited, Toronto



One-half of the 120-cell, 320 a.h. Exide-Chloride Battery recently installed at the Company's Grand Avenue Station. Used for standby service on the 125-volt station control bus on which system it is kept floating continuously. It is used also for standby emergency service on 220-volt stoker drive, normally fed from motor-generator sets.

Specify

BUDA-HUBRON Pole Hole Drills

for Economical Pole Line Construction and Repair

Buda-Hubron Pole Hole Drills will save you money on new pole line construction, replacement work, and repair work. These modern, efficient machines offer low first cost and low operating costs. Holes can be drilled up to 42 inches in diameter or to 50 feet in depth—drills holes 6 feet deep in 3 minutes. Standard drills can be mounted on truck, trailer, or tractor, and are equipped with 12, 25 or 40 H.P. engine.

Let us show you how to save more money on pole line work.

Write for Bulletin 868-W.

Cash in on R.E.A. Work—Rent a Buda-Hubron Earth Drill—Write for details of rental program.

BUDA JACKS

The Buda Company has been building quality Jacks for over 30 years, and has available a wide range of sizes of cable reel, pole pulling, automatic lowering, hydraulic, journal and screw Jacks, in capacities from 1½ to 100 tons.

Write for Jack Bulletin No. 950-W.

THE BUDA CO.
ESTABLISHED 1881
HARVEY (CHICAGO SUBURB) ILLINOIS

cleaned and washed by wet filter, said to remove dust, dirt and pollen from the air. Only an occasional refilling with water is said to be necessary.

•

Fire-Extinguisher

Portable carbon dioxide fire extinguisher features a pistol-grip handle and a trigger-control valve. Discharge horn is self-locking

"Kidde-Lux" two-pound fire extinguisher. **Walter Kidde & Co.**, New York, N. Y.

in any one of several positions according to location of the fire. Finger-tip control and balanced one-hand operation provide for discharge of carbon dioxide directly onto fire.

•

Distribution System

Flexible distribution system of movable outlets for industrial use is a three-wire system that can be used for different wiring and control circuits. Being three-wire, the system may be used in three-phase, two-

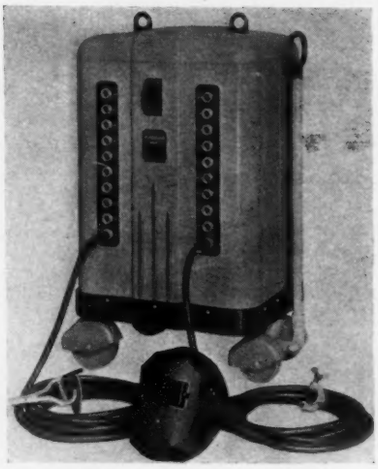
"Feedrail 60"; RLM-type fixture mounted to outlet box attached to trolley; track rating, 60 amp., 250 volts a.c. or d.c., three-wire, standard lengths of 10 ft.; trolley rating, 15 amp., 250 volts a.c. or d.c., three-wire. **Feedrail Corp.**, 125 Barclay St., New York, N. Y.

and three-wire adaptations. Track and trolleys are the essential parts of the system, with various accessories—stops, caps, feed-in boxes and the like—rounding out the line. Lighting fixtures and portable electric tools are typical mounting applications.

•

A. C. Arc Welders

Supplementing its line of arc welders, this company has announced a new arc welder having a range from 30 through 350 amp. Separate taps are provided for each



Model "400 B T" welder; 350-amp. capacity; 250-amp. Model "300 B T" not shown. **Marquette Mfg. Co.**, Minneapolis, Minn.

of the 19 heat stages; amperage is marked beside each tap. Transformer is designed to operate at full capacity continuously and to deliver a stable arc at any heat stage. This company has also brought out new truck- mounted a.c. welder, with a range of 20 through 250 amp.

•

Portable Printer

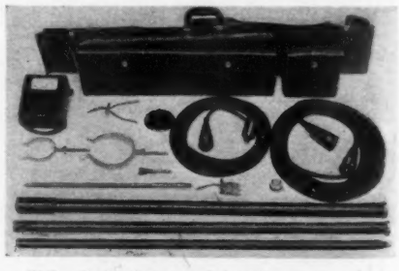
"Portaprint;" produces positive prints up to 18 x 12 in.; operates on 110 volts a.c. or d.c. **Eberbach & Son Co.**, Ann Arbor, Mich.

A built-in heater for volatilizing ammonia to speed up print developing time and a hinge front to permit better adjustment of the drawings under the printing frame have been added to this portable printing machine (previously announced in ELECTRICAL WORLD, March 25, 1939, page 88). Heater consists of a 20-watt shunt across the light source, mounted below an aluminum plate which dissipates the heat to the bottom of the developing tube. Radiation is said to keep the temperature down so ammonia does not boil.

•

Insulator and Bushing Tester

Equipment for testing insulators and bushings by the voltage gradient method has been announced by this company, supplementing previously announced equipment for insulator testing only (ELECTRICAL WORLD, January 2, 1937, page 134). A more sensitive instrument, change-over switch for high and low voltage and special prongs are new features of the tester. Designed for "live line" testing, this equipment gives clue to both location and extent of fault in insulator or bushing.



"Hipot" insulator and bushing tester; for use on lines up to and including 132 kv. **Roller-Smith Co.**, Bethlehem, Pa.

NEWS ABOUT PEOPLE

Wisconsin Utility Makes Davey Vice-President

A. F. Davey, manager of the Sheboygan-Manitowoc division of the Wisconsin Public Service Corp., has been elected vice-president. Mr. Davey began his work with Public Service in 1912 at Green Bay. He was previously employed at the Western United Gas & Electric Co. at Aurora, Ill. When the Sheboygan Gas Light Co. was acquired in 1915 he was placed in charge of operations there. In addition to his duties at Sheboygan, Mr. Davey is in charge of operations in the Manitowoc division and acts as adviser in technical problems at all gas plants in the company.

Early this year Mr. Davey was elected a director of the company, succeeding H. C. Cummins, Chicago, resigned. He has served on many committees in the Wisconsin Utilities Association and has been chairman of the merchandising section and of the gas operation section.

•

►PROF. GEORGE R. HARRISON, director of the research laboratory of experimental physics at the Massachusetts Institute of Technology, has been awarded the Rumford Medal of the American Academy of Arts and Sciences upon recommendation of Dr. Dugald C. Jackson, retiring president, for his work in spectrum photometry and spectrum analysis.

►WALTER E. LANDMESSER has been appointed sales manager of the commercial air conditioning and refrigerating division of the York Ice Machinery Corp. Mr. Landmesser obtained the first ten years of his commercial experience with the General Electric Co. in a similar capacity. During the past two years he has been in charge of the commercial and air conditioning division of Norge.

►S. R. WESTON, chief engineer in charge of the New Brunswick Power Commission, has been engaged in a consultant capacity by the British Columbia Utilities Commission. Mr. Weston, who has had experience with government-owned power plants, will be asked to investigate the British Columbia hydro-electric set-up, with special regard to appraisals and extensions in rural areas.

►ARCH ROBISON, city manager of Celina, Ohio, has been appointed chief engineer of the Public Utilities Commission of Ohio. Previous to his appointment at Celina, Mr. Robinson had been vice-president and general manager of the Central Ohio Light & Power Co., since its organization, with headquarters at Findlay, Ohio. Prior to going to Ohio Mr. Robison had been with the U.G.I. Contracting Co. of Philadelphia and with the J. G. White Engineering Corp.

►JAMES D. MORTIMER was elected a director of Associated Gas & Electric Co. at a recent meeting of the board of directors. He fills the vacancy created by the resignation of Henry R. Hayes. Mr. Mortimer, who was formerly president of the North American Co., has had a long career in the public utility industry.

Glosser Named President of Pacific Coast Group

Wallace W. Glosser, vice-president of Hubbard & Company at Emeryville, Calif., was elected president of the Pacific Coast Electrical Association at the recent convention in Pasadena, Calif. He served as vice-president of the association 1938-39.

Coleman

Mr. Glosser is well known in the electrical industry. After serving as district manager in New York City for Hubbard, he was appointed Pacific Coast manager in 1929. In 1936 he was elected vice-president of the Pacific Coast division and in this capacity has had charge of the company's operations in Arizona, Nevada and the three Pacific Coast states.

•

►A. C. DANEKIND of the General Electric Co. has been elected a director of the Carboloy Co. Mr. Danekind joined General Electric's manufacturing general department in 1933, after some years of affiliation with other divisions of the company, and from 1934 until early 1938 he served as chairman of the G. E. factory equipment and

practice committee. In this capacity he became widely known in the machine-tool industry and, at the present time, holds the office of president of the National Machine Tool Congress. Last year he was appointed assistant to Vice-President N. R. Birge and since then has been working closely with companies affiliated with General Electric.

•

L. L. Perry of Dubuque Assigned Broader Duties

Leonard L. Perry has been appointed business development manager of the Interstate Power Co. Mr. Perry entered the utility business at Pasco, Wash.,

in 1923 and has been engaged in sales work and business development for the past ten years.

He was associated with the Wisconsin Power & Light Co. in 1935 and acted as business development adviser for a group of utilities in Missouri in 1937, leaving in 1938 to become sales training director of the Kansas City Power & Light Co. He became affiliated with Interstate Power's business development department six months ago.

•

▶ T. W. SWARTZ has been made superintendent of the underground department of the Hawaiian Electric Co., Honolulu. He was formerly assistant superintendent, underground department, Northwestern Electric Co., Portland, Ore.

▶ CHESTER P. GROSS, formerly superintendent and general manager of the municipal water and electric departments of Wisconsin Rapids, Wis., has been appointed vice-president of the Albertson Electric Co. of Milwaukee, in charge of sales. After graduation from the University of Wisconsin, Mr. Gross entered the employ of the Railroad Commission of Wisconsin. From 1912 to 1916 he supervised and managed municipal and private utilities in Nebraska City, Neb., and Reedsburg, Wis. He was president of the Wisconsin Municipal Utilities Association in 1924 and 1925 and also served as chairman of the Wisconsin section of the American Water Works Association in 1923.

▶ JAMES R. WEAVER, director of equipment, inspection, purchases and tests of the Westinghouse Electric & Manufacturing Co.'s East Pittsburgh works, has been elected president of the American Society of Tool Engineers.

▶ CHARLES W. NICKERSON, chief electrical engineer at the New York World's Fair, has resigned to become vice-president in charge of operations of Claude Neon Lights, Inc. Mr. Nickerson has been a public utility engineer for twenty years.

•

Air Conditioning Group Names Danley President

Philip Y. Danley, manager of the air conditioning department of the Westinghouse Electric & Manufacturing Co., at East Springfield, Mass., was elected president of the Air Conditioning Manufacturers' Association at the recent annual meeting in Hot Springs, Va.

Mr. Danley became associated with Westinghouse in 1913. Among the positions he has held are the following: manager, Oklahoma office; manager, interior lighting section, South Bend, Ind.; merchandising manager, central district, Pittsburgh office, and manager of the refrigeration department, Mansfield, Ohio.

When the Westinghouse air conditioning department was reorganized in 1938 and established as a new separate department at East Springfield, Mr.

Danley became its manager. In his present position he is responsible for all commercial and household air conditioning activities.

OBITUARY

▶ GEORGE PEABODY GARDNER, who until his resignation in October, 1938, had served on the board of directors of the General Electric Co. for 43 years, died June 6 at his summer home in Bourne, Mass., in his eighty-fourth year. Mr. Gardner became a member of the board of directors soon after the consolidation of the Thomson-Houston Electric Co. and the Edison General Electric Co. into the General Electric Co. In addition to being a G. E. director, he served at one time or another as director of the American Telephone & Telegraph Co., International General Electric Co., Inc., and as an officer or director of numerous other industrial enterprises.

▶ JACOB G. CAMPBELL, an early leader in the development of the light and power field on the Jersey Coast, died May 12 in Fitkin Memorial Hospital, Asbury Park, N. J., in his seventy-seventh year. Forty-five years ago Mr. Campbell became superintendent of the old Atlantic Coast Electric Co., which has since been merged with the Jersey Central Power & Light Co. He retired from active service in the utility field in 1921. Mr. Campbell was at one time a member of the New Jersey Assembly.

▶ CHARLES B. PRICE, 69, pioneer electrical wholesaler at Boston and a director in several public utilities in the New England area, died suddenly at Swampscott, Mass., May 31. He was born in Salem, Mass., and joined the famous Pettingell Andrews Co. in 1889, becoming its treasurer and general manager in 1893. With his brother, Frank S. Price, long president of "P-A," he conducted the supply business until the G.E. Co. acquired a substantial interest in it in 1928, three years after the Stuart Street building was erected in the Back Bay district of Boston. In 1929 the former name was repurchased and the lighting fixture and studio business has since been operated at this site by the Prices. C. B. Price retired in 1933 as board chairman, being succeeded by Frank S. Price.

▶ WILLIAM J. CREELMAN, prominently identified with early electrical installations in Rochester, N. Y., died in that city June 2, after an illness of two months. His age was 88. Mr. Creelman had charge of constructing in 1887 the power plant of the Edison Electric Illuminating Co., the first company to furnish incandescent lighting in the city of Rochester. In 1920 he retired from the Barr & Creelman Co., an organization co-founded by his brother, after having been with the firm more than 28 years as a mechanical engineer.

MEANS TO AN END

OVENS, AIR BOMB, OXYGEN BOMB APPARATUS, WEATHEROMETER

CHEMICAL LABORATORIES

PAPER TESTING LABORATORIES

AIR-CONDITIONED ROOM

PHOTOMICROGRAPHIC LABORATORY

RECORDING SPECTROPHOTOMETER

ULTRA-VIOLET SPECTROMETER

INFRA-RED SPECTROMETER

INTEGRATING PHOTOMETERS

CANDLEPOWER DISTRIBUTION PHOTOMETERS

PROJECTION ROOM

ILLUMINOMETERS

LAMP LIFE TEST APPARATUS

SPECTROGRAPHS

QUARTZ SPECTROGRAPH

GLASS SPECTROGRAPH

REFLECTION FACTOR SPHERE

TRANSMISSION FACTOR SPHERE

Accelerated aging tests on materials, rubber, fabrics, paper, paint and varnish, building materials.

Checking of thermometers and pyrometers, General chemical analyses of construction and other materials, steel, leather, oils, soaps, linoleum, etc.

Tests of all physical and chemical properties of paper and fibers; strength, durability, reflection, etc.

Photomicrographs of metals, crystals; study of defects, fractures, wear, etc.

Measurement of materials and solutions for determination of spectral transmission, or reflection; study of radiation in different parts of spectrum.

Measurement of illuminating properties of commercial and residential lighting fixtures.

Tests of safety glass, reflector buttons, flares, automotive lighting equipment.

Candlepower distribution of headlamps, searchlights, projectors, floodlights.

Determination of illuminating properties of commercial and residential lighting fixtures—brightness, light distribution, illumination.

Tests of characteristics of reflectors.

Measurement of reflection factor of surfacing materials — paint, enamel, metal, etc.

Measurement of contrast ratio.

Measurement of light transmission of materials.

Rating and life testing of lamps.

Measurement of light sources for candlepower, light output, color temperature and radiation.

Measurement of extinction coefficient as related to Vitamin A content of fish oils.

Tests of sunburn preventives.

Ultraviolet and erythemal output of "sun" lamps.

Color determination of fabrics, paint, dye, paper, ink, etc.

Calibration of photocells, illuminometers, ocular photometers, Lovibond red glasses, standard filters, foot-candle meters.

Certification of IES lamps.

THE NEW E·T·L BUILDING

Know by **TEST**

ELECTRICAL TESTING LABORATORIES

East End Avenue at 79th Street **New York, N. Y.**

MANUFACTURING - MARKETS

Westinghouse Shows Gain in Bookings

Bookings of Westinghouse Electric & Manufacturing Co. moved sharply ahead in May after making substantial gains over 1938 during earlier months this year. New orders totaled approximately $20,000,000 in May, the third highest May in the history of the company. May, 1937, total, the highest for the month, was $20,733,000, while May, 1931, was $20,339,000.

For the first quarter this year bookings totaled $50,120,832, compared with $37,998,569 in the same 1938 period.

May business was the highest for any month so far this year. Except for April, when the month's business was about 2 per cent under March, the monthly total for each one has exceeded the previous one, with May more than making up for the April loss.

The increase in business for the company has been general for all divisions. The increase in merchandise business has been especially pronounced, with sales of refrigerators and ranges soaring.

•

Writer Sees Sales Gains in Electrical Equipment

Sales by the electrical equipment industry for the second quarter of 1939 promise to be the largest of any three-month period since the end of 1937, according to La Rue Applegate, writing in a recent issue of *The Annalist*.

Should volume expand faster in the next few weeks than is expected, the observer adds, total sales might reach the best level since the third quarter of 1937, or only slightly less than the post-depression peak.

•

Moves to Larger Quarters

Announcement has been made that the R. W. Cramer Co., Inc., formerly located in New York, has moved its general offices and the entire personnel, including the engineering division, into its large new plant located in Centerbrook, Conn. A New York sales office in charge of R. C. Heyl, a vice-president of the company, will be retained at the old location, 67 Irving Place.

•

Manufacturers Make New Appointments

Electrical manufacturing companies have recently announced the following assignments:

John A. Roebling's Sons Co. has announced the appointment of Earl N. Graf as manager of its Pittsburgh, Pa., branch at 855 West North Avenue.

Carrier Corp. has appointed the Gay Engineering Corp. of Los Angeles to represent it exclusively in Los Angeles County. Revision of the district office organization into seven districts was recently announced by J. I. Lyle, president.

General Electric Co. has appointed Milton J. Sands district manager of appliance sales in the Philadelphia area. Mr. Sands will succeed A. C. Sanger, who becomes sales manager of General Electric's household refrigerator sales section at Nela Park, Cleveland.

Square D Dividend; Calls Debentures

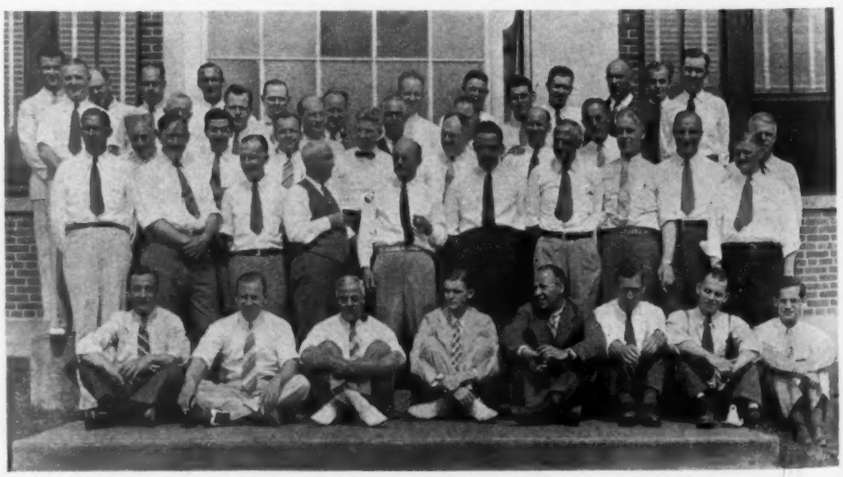
Square D Co., Detroit, will call on August 15 a block of $173,750 par value of 5 per cent debentures, Francis W. Magin, president, announced at a recent meeting of the board of directors. Upon the completion of this redemption the outstanding debentures will be reduced to $200,000.

A dividend of 30 cents was voted to common-stock holders of the company. On March 31 this year 15 cents was paid and on June 30 last year 15 cents a share was distributed.

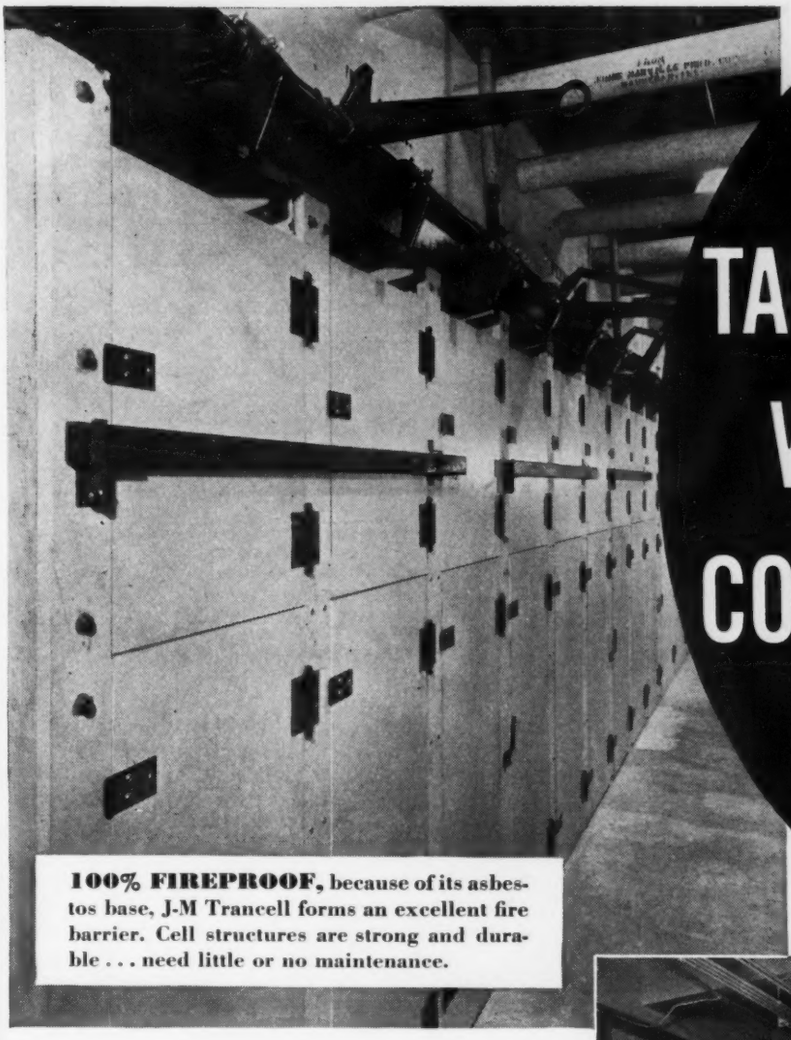
•

Servel Reports Increased Income in April Quarter

Servel, Inc., has reported for the quarter ended April 30 a net profit of $836,226 after depreciation, bond interest, federal income taxes and other charges. After dividend requirements on the 7 per cent preferred stock, the profit is equivalent to 46 cents each on 1,781,426 shares of $1 par common



SALES MEETING—Field representatives of Locke Insulator Corp. at the sales meeting held at the plant in Baltimore last week



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100% FIREPROOF, because of its asbestos base, J-M Trancell forms an excellent fire barrier. Cell structures are strong and durable . . . need little or no maintenance.

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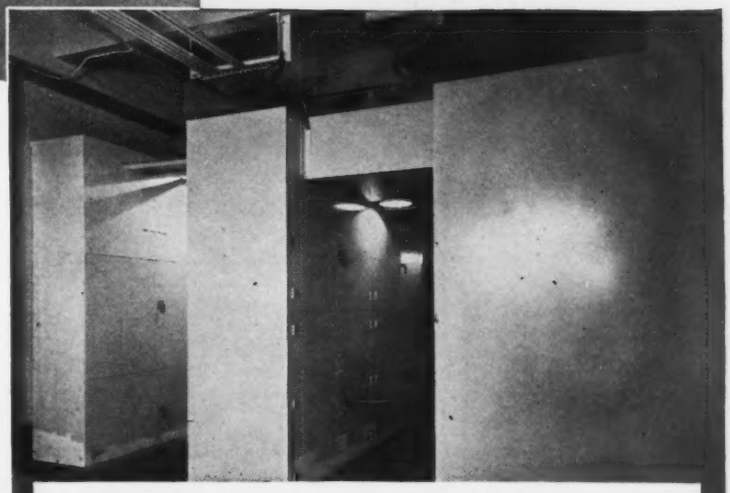
NO other cell-structure material offers the same important advantages as J-M Trancell. Supplied in large, ready-to-use sheets, it is easily worked and installed with ordinary tools. Construction is entirely dry . . . finished housings are neat, clean and attractive. Trancell's unusually light weight permits housing equipment on balconies and upper floors without danger of overloading. There is no fire hazard, for Trancell is basically asbestos, cannot burn or smolder. And its great strength and durability assure years of low-maintenance service. You will want full details. Write for Brochure D. S. 426. Johns-Manville, 22 East 40th Street, New York, N.Y.



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For Every Type of Distribution System

stock. This compares with $278,484 or 15 cents a common share, in the preceding quarter and $603,184 or 33 cents a share on common, in the April quarter of last year.

Net profit for the six months ended with April amounted to $1,114,710, or 61 cents a common share. In the same period of the previous year the net was $636,367, or 34 cents a share, on the common stock.

•

Appliance Sales Up 25%; Makers Hold Stocks Down

Members of the Institute of Cooking and Heating Appliance Manufacturers report sales are running about 25 per cent ahead of the first six months of last year, Samuel Dunckel, managing director, told the summer convention of the institute in Chicago last week.

Mr. Dunckel said that manufacturers are holding production very closely in line with actual orders. While confident of the outlook, Mr. Dunckel said, they are refraining from either accumulating inventories or indulging in optimistic forecasts. He said that prices on the fall lines are very firm, with advances of from 5 to 10 per cent over last year predominating.

•

Westinghouse Awarded Contract for Elevators

Hazel Atlas Glass Co., Washington, Pa., has awarded a contract to the Westinghouse Electric Elevator Co. calling for the installation of three new electric freight elevators in its factory.

Two of the elevators, with a capacity of 8,000 lb., will have a speed of 100 ft. per minute; the third, an electric hydraulic elevator, with a similar weight capacity, will have a speed of 25 ft. per minute. All three cars will be equipped with power-operated hatch doors.

The installation is expected to be completed by October, at a total cost of approximately $30,000.

New York Metal Prices

	June 13, 1939 Cents per Pound	June 7, 1939 Cents per Pound
Copper electrolytic ...	10.00*	10.00*
Lead Am. S. & R. price	4.75	4.75
Antimony	12.00	12.00
Nickel Ingot	35.00	35.00
Zinc spots	4.89	4.89
Tin Straits	48.25	48.75
Aluminum, 99 per cent.	20.00	20.00

* Delivered Connecticut Valley.

Field Reports on Business

Prospects for a business upturn in the fall are bright, a survey of manufacturers reveals. Electrical appliances show substantial gains in May over 1938, with refrigerators up 55 per cent. While business in some sections is spotty, favorable sales reports predominate for many lines.

NEW YORK

That prospects for a business upturn and for increased employment are brighter now than at any time since the first of the year were indicated in a survey of industrial concerns that are members of the Association of Manufacturers, Noel Sargent, secretary, said this week.

Improved weather conditions in May brought a sharp spurt in demand for electrical appliances and the substantial gains of previous months over 1938 were widened. Manufacturers' sales of refrigerators to distributors and dealers were up 55 per cent. Ranges moved ahead with May sales, rising 33 per cent. Water heater sales showed an increase of 25 per cent.

Comments of electrical manufacturers attending the E.E.I. convention last week, for the most part, were optimistic. While some reported business as spotty, others said that sales were moving ahead and that the number of inquiries showed an increase. Some believe that electrical industrial equipment is due for a spurt. One manufacturer expressed the opinion that his business was normal.

Utility leaders were heartened by reports that the industry is gaining in favorable public opinion. On this basis, it is believed many projects which have been held back, because of fear of the next government move, will soon get the go signal.

Building construction activities in this area continue at a good pace, providing an expanding market for electrical appliances, fixtures and wiring.

NEW ENGLAND

An interesting feature of the new pressure aqueduct of the Boston water supply now under construction was the recent purchase of eight Lincoln "Shield-arc" welders rated 200-300 amp., equipped with 15-hp. motors for the former and 20-hp. motors for the latter. These units are being used by the Lock-Joint Pipe Co. in the fabrication of forms for casting concrete pipe. A 500-amp. "Unionmelt" welder has been installed by this company for welding longitudinal seams of the forms; a 46-amp. 220-volt Westinghouse portable shop type welder has been bought by the West Construction Co. for general maintenance.

Small motor sales are steady, with a fair demand for variable-speed and geared motors among machine manufacturers. Recently U. S. Electrical Motors, Inc., closed the sales of several interesting pump motors.

Street lighting is progressing and special bridge lighting installations are increasing in this district. Westinghouse "Reflectolux" luminaires have been bought for several locations.

Steady progress in small switch and control apparatus sales is reported; line materials are spotty and heavy electrical machinery is quiet. Merchandising is advancing and sales of major electrical appliances show an increase for May as compared with 1939. Department store sales in New England showed a sharp upward trend last month; new lighting contracts are gaining and sign and oil-burner installations reported for the Boston area showed a marked advance for May as compared with last year.

PACIFIC COAST

Building construction in the seven states of the Pacific and Rockies slopes continues to increase, the volume of building permits for May being 25 per cent above May, 1938, and 20 per cent above May, 1937. Line construction material and substation equipment predominates in present purchasing, with several large jobs ready for award. Low bid for construction of the 260-mile, 287.5-kva. third line from Boulder to Los Angeles totaled $2,398,406 for three sections of 1,426 towers. Bethlehem Steel is supplying 32,122,100 lb. of steel towers and General Cable 6,437,000 lb. of hollow conductor cable.

Low bid for the 140-mile transmission line from Parker Dam to Phoenix was $124,194 and for the 120 miles from Parker Dam to Blairsdell, Ariz., was $85,500, both with copper wire. Bids are requested for ground wire and hardware for two 230-kva. circuits at Columbia River crossing of Bonneville lines and for three 15-kva. lines from Parker Dam to an Indian reservation, one of the several in the Southwest where much modernization work is proceeding. School building and unusually heavy reconstruction and remodeling during vacation season are under way. June orders for all standard materials are good and a nucleus of special orders carried over from May assures a good billing month.

CHICAGO

Further improvement was registered in general business conditions throughout the Middle West last week, widening the margin of increase over last year in many lines. Despite the shutdowns in the automobile industry because of labor strife, causing some curtailment in steel orders, production in the mills in this district showed an increase over the previous week. Retail trade increased moderately over the previous week to approximately 14 per cent above a year ago. Department store sales in Chicago, however, were well under the average for the entire area.

Electrical power output showed a slight increase over the preceding week and stood at 13 per cent above the comparable period last year. Appliance sales continue to make steady gains, with washing machines showing an increase of 22 per cent over last year's volume.

There is more evidence of resumption of active buying interest in many fields. Several new industrial developments will result in substantial orders for electrical equipment. A new paper plant, representing an investment of $3,500,000, will be erected. Additions to eight plants costing a total of $324,500 have been announced. Another company plans installations of motors and controls, electric hoists and conveyors to cost approximately $40,000.

TYPE 740-B
CAPACITANCE TEST BRIDGE

Capacitance Range: 5 uuf to 1100 uf

Capacitance Accuracy: ± 1% over major portion of its ranges

Dissipation Factor Range: 0 to 5% and 0 to 50%

Dissipation Factor Accuracy: within 1.5% over major portion of the range

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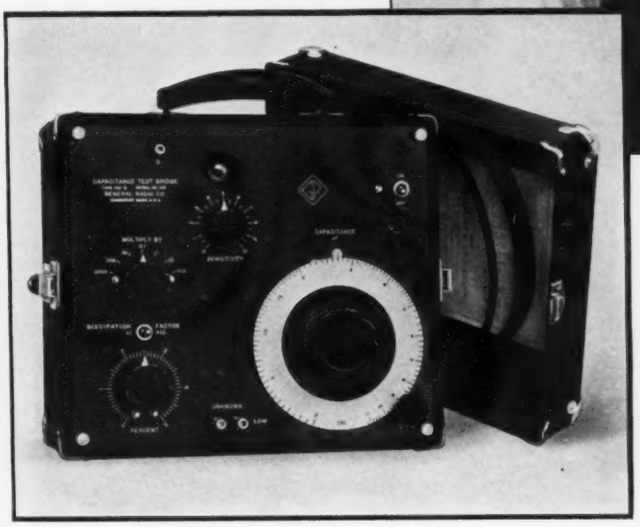
with all accessories



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Features of this Bridge are:

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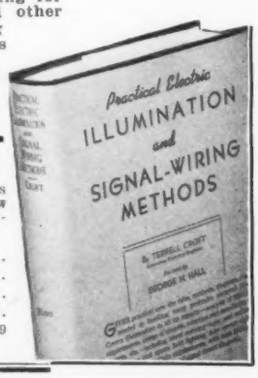

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Municipal Plants

LEBANON, IND.—In an appeal to the state Supreme Court, the Public Service Co. of Indiana has lost the decision against the city. The Supreme Court had entered mandate for the appointment of appraisers for appraisement of the company's property. The statute provides for appointment of disinterested freehold appraisers, residents of the county, and the lower court appointed appraisers so described. The company challenged the appraisers as not being disinterested because of being residents of the county, which was overruled. Appellants contend that residents of the county in which the city is located cannot be disinterested because the 1935 acts provide that the city may use its electric plant to provide energy to residents of the county outside the city which contention also is overruled.

PRESTON, IOWA—Citizens gave a four-to-one vote in favor of the erection of a municipal electric power plant in a recent election, the plant's cost not to exceed $45,000.

DELPHOS, OHIO—Citizens have organized a committee to study possibility of construction of a municipal light plant, a proposal which was rejected by residents two years ago.

LEXINGTON, TEX.—After having turned down the issue about two months ago, voters have decided overwhelmingly to acquire the privately-owned light plant and consolidate it with the municipal water plant. Revenue bonds of $54,000 were voted.

TEMPLE, TEX.—By a vote of 806 to 391, voters on June 2 defeated a proposal to issue $850,000 in bonds with which to finance construction of a municipal power and light system.

TEXARKANA, TEX.—U. S. fifth circuit court of appeals at New Orleans has taken under advisement the appeal of the Southwestern Gas & Electric Co., which seeks to halt the city from building a $545,000 municipal electric light system with a PWA loan and grant in direct competition with the company. The appeal was from an adverse district court ruling in which the trial judge ruled the municipality was empowered by charter to acquire its utilities and that Southwestern Gas & Electric "has no justifiable interest in the case."

WEIMER, TEX.—City Council has tentatively set July 5 as date for an election at which voters are to decide on a $50,000 bond issue to acquire a municipally-owned light and power plant. The proposal is for issuance of $50,000 revenue bonds, bearing 3½ per cent.

KENEDY, TEX.—In a warmly contested election, citizens turned down by a vote of 225 to 217 a proposal to float $100,000 in revenue bonds to build a municipal electric system to distribute Lower Colorado River Authority power. Voters of La Grange and Eagle Lake also recently rejected similar proposals, preferring to rely on the facilities of privately owned systems. Kenedy and surrounding towns are now served by the electric network of Central Power & Light Co., which has nine major plants in the south Texas area.

HAZEL GREEN, WIS.—At a referendum, citizens rejected by a 232 to 34 vote a proposal to sell the municipal electric plant to the Interstate Light & Power Co. On complaint of customers last year concerning rates, the Wisconsin Public Serv-

ice Commission made an engineering and accounting investigation and recently directed the village to rebuild the plant at a cost of not less than $2,000.

CUMBERLAND, WIS. — Suit has been brought in Circuit Court at Cumberland to enjoin the city from building a municipally owned electric light and power plant. Defendants named in the action are the city of Cumberland, Mayor Henry S. Rose and K. D. Cavanaugh, clerk of the city. The plaintiffs charge that bonds issued to raise the city's share of funds for WPA generating and distributing system projects were illegal.

•

Recent Rate Changes

DUKE POWER CO. has announced reductions in rates, effective June 1, that will save customers approximately $1,509,000 a year. The reductions totaled $1,454,000 on electricity and $55,000 on gas. Officials of the company expressed hope that the reductions will result in increases in the use of electricity in the two Carolinas. Residential savings on the net bill will work out as follows: for a home using 100 kw.-hr., the reduction will be from $3.65 to $3.20; for the home using 150 kw.-hr., the reduction will be from $4.80 to $4.20, and for the home using 300 kw.-hr., the reduction will be from $7.80 to $7.20. Duke rates in North Carolina will be slashed approximately $1,000,000 a year and rates in South Carolina approximately $500,000. The commercial scale for stores and small businesses: First 10 kw.-hr. will remain at 80 cents, but 50 kw.-hr. will be $2.20 instead of $2.40; 100 will be $3.05 instead of $4.40; 200 will be $7.45 instead of $7.90, and 300 will be $10.45 instead of $11.40. The general power rate schedule, which applies to most industrial plants, was also reduced, as were rates to municipalities.

ARKANSAS POWER & LIGHT CO. has announced a reduction in residential power rates that is expected to amount to $300,000 annually. The new rate is 3½ cents a kilowatt-hour for the first 100 kw.-hr.; 3 cents a kilowatt-hour for the next 100 and 2 cents a kilowatt-hour for all in excess of 200. The schedule includes a 10-cent increase in the monthly "readiness to serve" charge. A rate of one cent for off-peak water heating up to 15 kw.-hr. also is provided. The present rate is 5 cents a kilowatt-hour for the first 50 kw.-hr.; 4 cents a kilowatt-hour for the next 50; 3 cents for the next 50 and 2 cents for all in excess of 150. The new rate will become effective as soon as new billing charts and other details can be revised, probably about September 1.

WASHINGTON WATER POWER CO. has announced general rate cuts reducing residential, farm, commercial and street-lighting charges $250,000. The new schedule became effective throughout the territory of the company in Washington and Idaho, with meter readings after June 5. Based on present customers use it is expected the rate slash will save $201,000 to Washington customers. Approximately $111,200 of this will apply to residential and farm users, $44,000 to commercial businesses and $45,800 to street-lighting and other uses.

MISSISSIPPI POWER & LIGHT CO. has announced a rate reduction for residential consumers, affecting approximately 300

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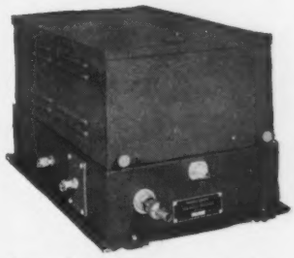

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communities, and bringing about an estimated saving of $265,000 annually. It is the second rate reduction made by the company in less than a year. The reduction will give consumers the following schedule. 3¾ cents, 3 cents, 2 cents and 1½ cents to all residential consumers, with a special one-cent rate for electric water heating; customers will receive 50 per cent more kilowatt-hours for their monthly minimum, this now including 15 instead of 10 kw.-hr. The new rates will be effective on all service bills rendered on and after June 26.

LOUISIANA PUBLIC SERVICE CORP. has been directed by the state Public Service Commission to put into effect a new rate schedule reducing rates from about 7 to 30 per cent for the various classes of customers. The order was issued last December, but was held open for further study and recently ordered made effective. On domestic bills the minimum will be $1.00 per month, plus 50 cents per kilowatt of connected capacity of domestic heating and cooking appliances in excess of 2 kw. On commercial bills, the minimum will be $2.50 per month, plus 50 cents per month per kilowatt of connected capacity of heating and cooking appliances.

VIRGINIA ELECTRIC & POWER CO. has reduced rates to the State of Virginia approximately $26,000 annually. Governor Price, in announcing the results of the negotiations said the larger consumers among the state institutions with a demand of 25 kw.-hr. or more will pay a flat rate of one cent per kilowatt-hour in cases where they do not generate any part of their own energy. The new agreement will be submitted shortly to the various state institutions and agencies in the company's territory. Institutions which generate part of their own energy will receive a rate of 1¼ cents per kilowatt-hour, which is virtually the rate now in effect.

NIAGARA, LOCKPORT & ONTARIO POWER CO. and the Lockport & Newfane Power & Water Supply Co. have been ordered by the New York Public Service Commission to amend off-peak industrial electric rates by July 1 so as to establish a demand charge of 15 cents per kilowatt of off-peak demand in the rates which were filed some time ago and suspended by the commission pending an investigation of the off-peak provisions of the proposed rates for industrial customers in the western New York territory of the companies.

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Will Electrify Texas Road

Complete electrification of the Texas-Mexican Railroad, which runs between Laredo and Corpus Christi, 160 miles, will be accomplished as rapidly as possible, it was announced at the general office of the line in Laredo. The first two of seven electric locomotives will be received and placed in operation early this month and the remainder will be delivered at the rate of two or three a month until the order has been filled. The railroad, formerly a part of the National Railways of Mexico, a Mexican government-owned system, traverses the heart of the ranch and oil-producing region of south Texas.

Sales Opportunities

DETROIT, MICH.—Detroit Edison Co. has plans under way for new distribution power substations at Pontiac, Inkster and Garden City, Mich., primarily for increased service for industrial consumers in these districts. Line extensions and improvements also will be made for this purpose throughout the areas noted. Company has plans in progress for new power substation on Puritan Street, Detroit, for expansion in distribution facilities in Northwest part of city.

NORWALK, OHIO—City Council is arranging early call for bids for extensions and improvements in municipal electric power plant, with installation of equipment. Cost estimated about $80,000.

KNOXVILLE, TENN.—Director of Purchases, Tennessee Valley Authority, receives bids until June 26 for two 36,000-kva., 13,800-volt, three-phase, 60-cycle, vertical shaft a.c. generators for installation in Wheeler hydroelectric generating station, to be known as Units Nos. 3 and 4. Also, until June 21 for two hydraulic turbines for generators noted, with governors and auxiliaries.

ROCHESTER, N. Y.—Eastman Kodak Co., Kodak Park, plans installation of motors and controls, regulators, conveyors, elevators and other equipment in new seven-story and basement addition, approximating 260,000 square feet of floor space, for expansion in film-manufacturing department. Final plans have been approved, with superstructure to begin before close of the month. Cost estimated close to $1,000,000.

BLUEFIELD, W. VA.—Appalachian Electric Power Co., Roanoke, Va., plans extensions in transmission and distributing lines for connections with distribution systems of Southern Utilities Co. in and near Hurricane, Hamlin, West Hamlin, Griffithsville and Fort Gay, now being acquired. Additional power substation and service facilities will be installed in these districts, where franchises are now being secured. Project has been approved by State Public Service Commission.

FORT COLLINS, COLO.—City Council has preliminary plans for extensions and improvements in municipal electric power plant, including installation of a new boiler unit and accessories, turbo-generator and auxiliary equipment. This will make the third generating unit in station. Cost about $320,000. Financing is being carried out through Federal aid.

NEWPORT BEACH, CALIF.—Southern California Edison Co., Los Angeles, plans three-wire submarine cable line from Balboa Island across Newport Bay to mainland at Newport Beach for transmission service in that area, where extensions will be made in distribution lines. Application has been made for Federal permission.

TRENTON, MICH.—Monsanto Chemical Co., 1700 South Second Street, St. Louis, Mo., plans installation of motors and controls, transformers and accessories, switchgear, conveyors and other equipment in proposed new branch plant at Trenton, where company has options on tract of about 160 acres of land. New plant will comprise several large one and multi-story units. Cost reported close to $2,500,000.

BROOKLYN, N. Y.—Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, receives bids until June 26 for large quantities of cable, including one lot of 38,500 lineal feet; and other allotments: 20,000 to 55,000 lineal feet; 40,000 to 60,000 lineal feet; 40,000

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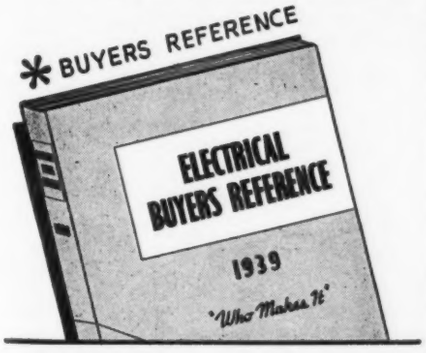

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to 60,000 lineal feet; 10,000 to 45,000 lineal feet; 10,000 to 45,000 lineal feet; 40,000 to 60,000 lineal feet: 40,000 to 60,000 lineal feet; and 40,000 to 60,000 lineal feet. Also for 11 reels (Circular 266). Until June 29 for similarly large quantities of telephone wire (Circular 276).

COLUMBUS, OHIO—Kroger Grocery & Baking Co., 35 East Seventh Street, Cincinnati, Ohio, plans installation of electric generating unit and auxiliary equipment in power house at branch plant at 2210 Lockburne Road, Columbus. Cost reported about $50,000. A. M. Kinney, Inc., Carew Tower Building, Cincinnati, is consulting engineer.

TOLEDO, ORE.—West Coast Power Co., Portland, Ore., plans extensions in transmission lines in vicinity of Toledo.

FORT PECK, MONT.—Department of Interior, Washington, D. C., is securing an appropriation of $2,000,000 for coming fiscal year for hydro-electric power development at Fort Peck. Work will be carried out under direction of Bureau of Reclamation, Denver, Colo. Another appropriation of $7,000,000 is being obtained for similar power development at Bonneville, Ore. project to be carried out under direction of F. A. Banks, Administrator of Bonneville Project, Portland, Ore.

KALAMAZOO, MICH.—American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y., plans installation of motors and controls, regulators, transformers and accessories, switchgear, conveyors and other equipment in new plant at Kalamazoo, consisting of several one-story units. Proposed to begin work soon. Cost estimated close to $300,000.

MARE ISLAND, CALIF.—Bureau of Yards and Docks, Navy Department, Washington, D. C., receives bids (no closing date stated) for lighting and power systems for foundry at Mare Island Navy Yard (Specifications 9177).

WAPATO, WASH.—Department of Indian Affairs, U. S. Irrigation Service, Eighth and Figueroa Building, Los Angeles, Calif., has plans under way for new hydroelectric power plant in vicinity of Wapato. Bids are scheduled to be asked in near future.

HOUSTON, TEX.—Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, Pa., plans installation of motors and controls, conveyors, transformers and accessories, loaders and other equipment in new paint and varnish-manufacturing plant on 21-acre tract of land on Liberty Road, Houston, recently acquired. Cost reported over $400,000.

KALISPELL, MONT.—Flathead Power Co., Kalispell, has approved plans for immediate construction of primary and secondary lines in parts of Flathead County, totaling about 59 miles, for rural electrification. Work will be carried out during summer.

•

British Output Advances

Official returns made to the British Electricity Commission show that 2,046,000,000 units of electricity were generated by authorized undertakings in Great Britain during April, compared with the revised figure of 1,849,000,000 units in April, 1938, an increase of 10.7 per cent. During the four months of 1939 the total amount of electricity generated was 9,591,000,000 units, compared with the revised figure of 8,487,000,000 units for the corresponding period of 1938, an increase of 13.0 per cent.

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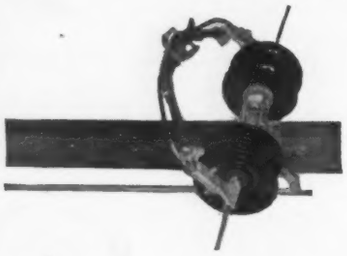

A K-P-F switch merely consists of two deadends with a rigid jumper containing a contact so arranged that it can be opened and closed. This constitutes the NECESSARY and SUFFICIENT parts of a disconnecting switch.

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REA Allotments; Contracts Awarded

Among the recent allotments made by the Rural Electrification Administration are the following:

COLORADO—San Miguel Power Assn., Inc., Wilton T. Hutt, president, Nucla, $139,000 to build 116 miles of line, 482 members in San Miguel and Montrose counties.

ILLINOIS—Illinois Rural Electric Co., H. G. Bryan, supervisor, Winchester, $113,000 to build 105 miles of line, 320 members in Morgan County.

INDIANA—Kankakee Valley REMC, Harvey B. Hartsock, 1011 Fletcher Trust Bldg., Indianapolis, correspondent, $170,000 to build 180 miles, 488 members in LaPorte, Starke and St. Joseph counties.

IOWA—Osceola Electric Co-op., Inc., Henry Consoer, president, Sibley, $181,000 to build 197 miles, 471 members in Osceola County.

KANSAS—Butler Rural Electric Co-op. Assn., A. H. Gish, president, El Dorado, $132,000 to build 138 miles of line, 312 members in Butler and Sedgwick counties.

LOUISIANA—Bossier Rural Electric Membership Corp., J. H. Mercer, president, Benton, $104,000 to build 113 miles of line, 389 members in Bossier, Webster and Bienville Parishes.

TENNESSEE—Tri-County Electric Membership Corp., Will Hall Sullivan, supt., Lafayette, $193,000 to build and acquire 112 miles of line, 1,495 members in Macon, Sumner, Trousdale, Clay and Pickett counties. Town of Dickson, D. E. Beasley, Mayor, $199,000 to acquire and build 154 miles of line, 1,186 members in Houston and Dickson counties.

VIRGINIA — Craig-Botetourt Electric Co-op., Clay D. Huffman, supt., Newcastle, $150,000 to build 126 miles of line, 430 members in Craig, Roanoke, Botetourt, Alleghany, Montgomery and Giles counties, Va., and Monroe County, W. Va. Virginia Electric Co-op., W. H. Brown, manager, Bowling Green, $114,000 to build 111 miles of line, 414 members in Caroline, Hanover, Spotsylvania, Louisa, King and Queen and Orange counties.

TENNESSEE—Meigs County Electric Membership Corp., Decatur, W. S. Bates, manager, $487,000 to acquire and build 324 miles of line, 2,570 members in Cumberland, Putnam, Smith, Rhea, McMinn and Fentress counties. Middle Tennessee Electric Membership Corp., Murfreesboro, W. O. Haggard, Jr., supt., $680,000 to acquire and build 525 miles of line, 3,603 members in Rutherford, Wilson, Cannon and Williamson counties. Duck River Electric Membership Corp., Shelbyville, F. J. Wallheiser, supt., $1,161,000 to acquire and build 590 miles of line, 4,488 members in Franklin, Bedford, Coffee, Maury, Marshall and Warren counties. Cumberland Electric Membership Corp., Clarksville, M. C. Northington, supt., $265,000 to acquire and build 192 miles of line, 1,663 members in Montgomery, Stewart, Houston, Robertson and Sumner counties. Upper Cumberland Electric Membership Corp., Carthage, W. E. Landers, supt., $485,000 to acquire and build 381 miles of line, 2,975 members in Jackson, Putnam, Overton and Smith counties. Merriwether-Lewis Co-op., Centerville, Douglas Bates, acting secy., $392,000 to acquire and build 280 miles of line, 2,109 members in Hickman, Humphries, Perry and Lewis counties.

WISCONSIN—St. Croix County Electric Co-op., Baldwin, Wis., William Rutzen, supt., $238,500 to build about 256 miles of line, 675 members in St. Croix, Polk, Dunn and Pierce counties.

Construction contracts:

Howard County Electric Co-op., Cresco, Iowa, William C. Shea, acting supt., and K. R. Brown, Des Moines, Iowa, engineer, contract to Sandberg & Johnson Construction Co., Hampton, for building entire project, 82 miles of line, 401 members; bid $116,776.

D. E. K. Rural Electric Co-op., Estherville, Iowa, Harry Day, acting superintendent, and Young and Stanley, engineer, contracts to the Acme Construction Co., St. Paul, Minn., and Sandberg and Johnson Construction Co., Hampton, Iowa, for building two sections, 266 miles of line, 499 members and 182 miles, 342 members; bids $208,117 and $142,611.

Pemiscot-Dunklin Electric Co-op. Assn., Hayti, Mo., Glenn Eaker, supt., and Sverdrug and Parcel, St. Louis, Mo., engineer, contract to the MacDonald Construction Co., St. Louis, another section of project, 330 miles of line, 981 members; bid $221,627.

Ozark Electric Co-op., Mt. Vernon, Mo., W. L. Boucher, supt., and Black and Veatch, engineer, contract to Midland Constructors, Inc., Chicago, Ill., another section of project, 247 miles of line, 630 members; bid $201,374.

Union Electric Membership Corp., Monroe, N. C., C. O. Howard, Jr., supt., and Gibbs and Hill, New York City, engineer, contract to the Miller-Baxter Co., Inc., Indianapolis, entire project, 500 miles of line, 1,852 members; bid $338,425.

South Central Rural Electric Co-op., Inc., Lancaster, Ohio, Darwin Kindler, manager, and Gibbs and Hill, New York City, engineer, contract to Andrews Asphalt Paving Co., Hamilton, Ohio, another section, 270 miles of line, 800 members; bid $204,097.

Buchanan County Rural Electric Co-op., Independence, Iowa, Alvin J. Tonn, supt., and K. R. Brown, Des Moines, engineer, contract to the Sandberg and Johnston Construction Co., Hampton, Iowa, entire project, 272 miles of line, 544 members; bid $187,818.

Lyon County Electric Co-op., Inc., Emporia, Kan., Prentiss M. Dickerson, supt., and G. H. Guernsey, Cherokee, Okla., engineer, contract to Cook-O'Brien Construction Co., Kansas City, Mo., entire project, 161 miles of line, 296 members; bid $106,951.

South Central Electric Assn., St. James, Minn., Edward C. Meier, supt., and Bannister Engineering Co., St. Paul, engineer, contract to E. W. Wylie, Inc., St. Paul, another section of project, 234 miles of line, 408 members; bid $160,681.

Eastern Nebraska Public Power District, Syracuse, Neb., F. A. Martz, manager, H. H. Henningson, Omaha, engineer, contract to Crawford Electric Co., North Platte, Neb., another section, 152 miles of line, 255 members; bid $115,589.

Wayne County Rural Public Power District, Wayne, Neb., H. W. Noeding, supt., and H. H. Henningson, Omaha, engineer, contract to Peter Kiewit Sons Co., Omaha, entire project, 158 miles of line, 227 members; bid $110,144.

Rutherford Rural Electric Mutual Assn., Inc., Forest City, N. C., D. B. Crew, supt., and B. O. Van Nort, Port Deposit, Md., engineer, contract to Little Electric Co., Union, S. C., another section, 207 miles of line, 370 members; bid $155,412.

Halifax Electric Membership Corp., Scotland Neck, N. C., Thomas B. Salde, Ill., supt., and W. W. Corcoran, engineer, contract to B. W. Jackson, Inc., Richmond.

Va., entire project, 225 miles of line, 675 members; bid $142,143.

Cass County Electric Co-op., Inc., Kindred, N. D., M. H. Strehlow, supt., and M. S. Hyland, Fargo, N. D., engineer, contract to Zontelli Brothers, Crosby, Minn., another section of project, 202 miles of line, 500 members; bid $155,972.

Northeast Oklahoma Electric Co-op., Inc., Vinita, Okla., Lee Spalding, supt., and Midwestern Engineering & Construction Co., Tulsa, engineer, contract to Richards and Mullinix, Oklahoma City, entire project, 287 miles of line, 560 members; bid $185,456.

Farmers Electric Co-op., Inc., Greenville, Tex., Charles M. Curfman, supt., and Edward A. Meyle, engineer, contract to P. E. Workman, Dallas, Tex., another section of project, 232 miles of line, 580 members; bid $119,302.

•

Illinois Electric Sales Advance 9.6% in April

Total sales of electricity to ultimate consumers by eleven large Illinois electric utilities during April, as compared with the totals for the corresponding month last year, revealed a 4.8 per cent increase in revenue, a 9.6 per cent increase in kilowatt-hours and a 1.7 per cent increase in the number of customers.

Residential sales in April revealed increases of 3.2 per cent in revenue, 6.5 per cent in kilowatt hours and 1.6 per cent in the number of customers as compared with the same month last year. The total residential kilowatt-hour sales were 5.4 per cent lower than for March, 1939. Rural sales continued to register increases in April as compared with the same month last year. Power and other sales increased 5.2 per cent in revenue and 10.2 per cent in kilowatt-hours when compared to April, 1938.

•

First Electric Elevator

The first electric elevator, hung on cables and balanced by counterweights, was installed in Baltimore in 1887, Westinghouse Electric & Manufacturing Co. reports in a folder sent to stockholders with dividend checks. The first elevator builder was Archimedes. In 236 B.C. he designed an ingenious hoisting device operated by man-power.

•

Gas Turbine for Swiss

What is claimed to be the first constant-pressure gas turbine for electric power generation has recently been completed by the Brown-Boveri Co. of Baden for the electric power station at Neuchatel, Switzerland. The machine is coupled to a 4,000-kw. generator and is being used as a standby set.

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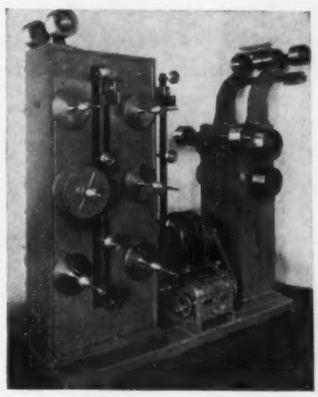

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JULY 29

Editorial FEATURE

"LIGHTING FOR REVENUE"

★

What the Customer Thinks of Utilities

[*Continued from page* 45]

bills high. Only 16 per cent of the people who called the gas company most courteous said it should be owned by the city, but 48 per cent of the people who called it least courteous said it should be owned by the city.

Our Friends Are Honest

Thus there is established a definite relationship in the minds of the public between courtesy, civic activity, reasonableness of rates and municipal ownership. As a matter of fact, the effects of being a good neighbor and a good citizen are even broader than that. We asked whether they regarded the meters of these companies as honest and dependable, and while 14 per cent questioned the electric meters, 40 per cent questioned the gas meters. Apparently it is with great difficulty that people believe bad things about their friends, even if their friends are public utilities.

We thought the views of people as to whether these companies were locally owned or owned by out-of-town interests might have some effect on their other views, particularly their views as to civic activity. Apparently judgment was being based, however, purely on merit and regardless of where the ownership rested because only 16 per cent regarded the electric company as being locally owned and 30 per cent regarded the gas company as being locally owned. As a matter of fact, neither one was locally owned.

Faith in the American Way

What does this all add up to? To me it is another bit of corroborating evidence which fits in perfectly with other results of the last five years spent in probing the public's mind. Our people have faith in this country as a land of opportunity; they like the idea of an industrial or competitive society; they believe in competition, where it is possible, as a means of keeping business alert, progressive and honest, and they believe in close government supervision where competition is not feasible as a means of achieving those same ends. They have faith in and respect for most of the people engaged in business and they have even greater faith in and respect for their own democratic system of government. They want to keep in their community good neighbors and good citizens, and they want to get rid of bad neighbors and bad citizens. They are the jury which will eventually decide what they want to buy, in what manner they want to buy it, how much they want to pay for it, and from whom they want to buy it. I regard them as a completely fair, tolerant and intelligent jury. Given a free and intelligent press and an equally free and intelligent radio as means of disseminating information, I would believe that the American public would sooner or later pass a fair judgment on any of you, on any other business, or on any politician.

As a matter of fact, many of you in the electric utility business have improved, during the past five years, as neighbors and citizens and merchants, and our surveys show that the public is aware of that improvement and, in turn, is friendlier to you than it was some time ago.

One Kilowatt-Hour

[*Continued from page* 55]

watts in one of the hod-carrying jobs, up to seventy-two watts rowing, and pushing on a capstan.

Since laborers can only do from $\frac{1}{2}$ to $\frac{1}{10}$ what most people think, that convinces me that electricity is two to ten times cheaper than most people think.

What an opportunity—yes, privilege—is yours to tell 30,000,000 housewives how electricity can drive out the dirty, dreaded drudgery from their homes, preserve their health, youth and beauty, and also save money doing it.

Perhaps by next year you will have received the blessings of a million rejuvenated housewives, important citizens—transformed into enthusiastic boosters for your business. It is not beyond imagination that their enthusiasm may be more valuable to you than the added revenue.

Build load, and you also build the good will that comes from full use.

For the all-electric home is not the white elephant, but the white hope, of the electrical industry.

Five Sides to TVA Purchase Authorization Bill

[*Continued from page 58*]

subsidiaries. But they have *not* been talking about the fact that only a part of this is to be actually paid by TVA itself. A considerable part of it will be paid by local units, with which the TVA has no technical connection at all, and which will not have access to any part of this desired $100,000,000 bond issue.

For example, Chattanooga will finance its purchase of the local Tennessee Electric Power Company system independently, though as part of the big deal. So will Memphis its purchase of an Electric Bond & Share subsidiary's plant. Hence some of the estimates as to how much of this $100,000,000 bond issue proceeds TVA would have left after paying its own share of the payments to the private utilities run as high as seventy millions.

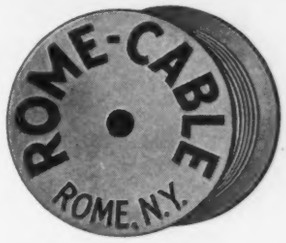
This may be way off, but Chairman May, of the subcommittee of the House military affairs committee, stated that the $65,000,000 his group approved, instead of $100,000,000, would allow a "leeway" to TVA of $5,000,000 after making the payments contemplated in the agreements with the utilities. And this in spite of an added requirement that TVA retire bonds amounting to $3,500,000 issued to finance loans to local communities.

His committee also added a provision providing that a sinking fund be set up to retire the new bonds. Even more annoying, the committee wrote in a requirement that TVA should be audited by the Comptroller-General's office, though this does not have the sting it would have since the appointment of Lame Duck Senator Brown of New Hampshire to the comptroller-generalship.

•

Sells Radio Station

Sale of radio station WFBM by the Indianapolis Power & Light Co. to Harry M. Bitner of Pittsburgh has been announced by Harry T. Pritchard, president of the Indianapolis utility. The sale is contingent upon approval of the Federal Communications Commission. Mr. Bitner, a former Hearst newspaper executive, recently incorporated WFBM to operate the station. WFBM was organized by the old Merchants Heat & Light Co.



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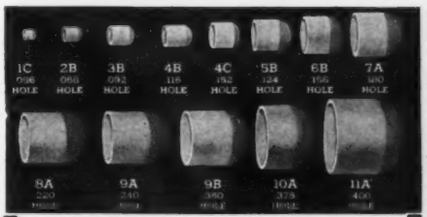

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Reprint from the Spring 1939 issue of Timely Ideas

N.Y. Herald Tribune, Dec. 4, 1938...

Il Duce Spurs Home 'Boom' Across Libya

Special Correspondence

TRIPOLI, North Africa, Nov. 20.—A building boom without a parallel in the history of North Africa has just reached its climax with the completion of nearly 3,000 private dwellings, more than 200 apartment houses, hotel and municipal buildings in the City of Tripoli.

This almost fantastic feat has been accomplished in the last four years by Marshal Italo Balbo, Governor of Libya, under the direction of Premier Mussolini.

Native Furniture Priced $600

Native-built furniture for a six-room home in Tripoli can be purchased for about $600. With native Arab labor obtainable at about 30 to 45 cents a day and skilled labor available at 60 cents a day, one readily can comprehend the economy in furniture, servants and domestic help in general. A large private home of about ten rooms can be furnished comfortably for less than $1,000.

'THIS IS ITALIAN PROPAGANDA—

WHILE HERE AT HOME

IT IS REALITY. IT IS OURS!

Here, nearly any ambitious man or woman may have an attractive home.

Here is a release from an American propaganda agent for the Italian Government. In Tripoli, it says, you can buy native furniture for a six-room house for $600. This, they explain, is possible because skilled labor there gets only 60 cents a day.

Of course, it is only the rich folks and the foreigners who can afford this furniture. The Tripoli workman cannot buy it himself—not on an income of 60 cents a day.

Yet here for years we could acquire a six-room houseful of sound furniture for $600 or less. We did not ballyhoo this fact. We accept it as a matter of course.

But the difference is that everyone may have the furniture in this country. Our wages are high. Working people can afford the products which they themselves produce.

Perhaps this is a miracle of democracy.

More likely, however, it is a tribute to our manufacturers. They have been free to run their own businesses. So they have been willing to adopt methods, processes and materials that cut costs. Progress to them means that goods continually must be made to sell for less.

This requires better and better working conditions, new mechanical and electrical developments to help labor produce more and earn high wages.

It has been possible to an important degree because of low cost electric power furnished by the public utilities. Steadily year by year they have made power useful in new ways and more profitable. This has been one of the inner secrets of our national progress, and it is not propaganda.

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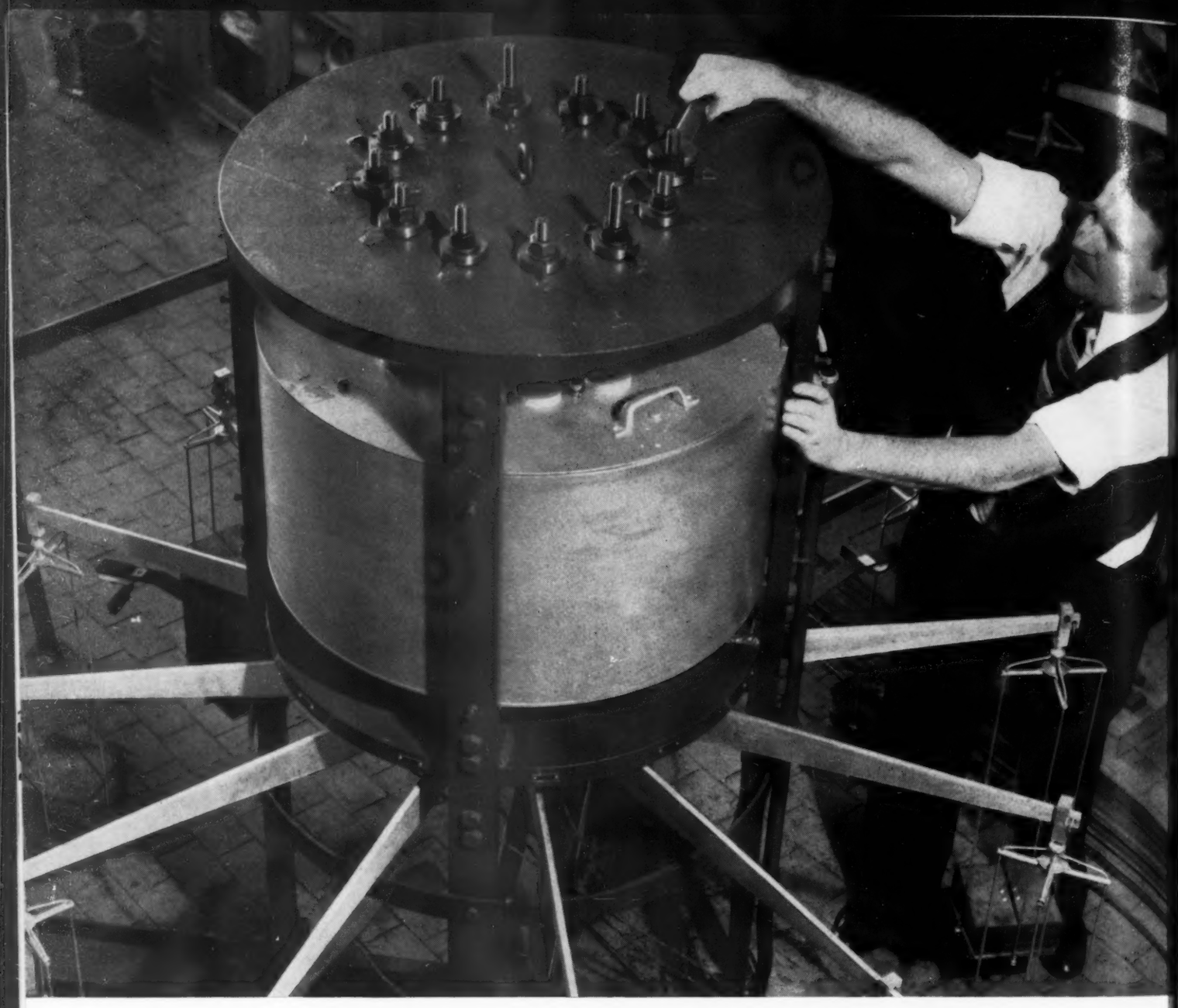

And We'll Find a Better Recipe

CHOOSING the composition of a batch of steel is like selecting the recipe for a pudding—with iron as the main ingredient, and with molybdenum, tungsten, nickel, and chromium carefully measured in for seasoning. Added in varying quantities, "baked" by different heat treatments, they produce steels with varying characteristics.

Still, there is *one* combination and *one* heat treatment which will yield a steel capable of withstanding even *higher* temperatures and *higher* pressures than are used in today's turbines.

To find it, we've been continually "proving the puddings" since 1925. Bars of different kinds of steel are tested for years at a time at constant temperatures as high as *1200 degrees F* and at stresses up to *60,000 pounds per square inch.*

With what result? Today a turbine rotor, weighing 20 tons, whirls at tremendous speed inside a shell withstanding pressures like those found a half-mile down in the ocean. *But the rotor spins true, and the shell doesn't leak.* The turbine may actually change size, but the changes are always symmetrical and uniform. And they never exceed a millionth of one per cent per hour.

Controlling these changes, known as "creep," has made possible the development of machines with increasing efficiency, thus contributing to the lower costs of electrical generation. And as we learn more about creep, so will you save more in fuel costs. Such untiring research, as illustrated by this search for better steel, is but one of the added benefits which come from your purchases of General Electric equipment.

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